Badger Meter

Fluid Managment System

LMS-RF Basic System

LMS_RF System Basic System-Zigbee_BA_02_1507

User Manual

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INTRODUCTION

The Badger Meter® Fluid Management System has been designed to control and monitor the consumption and inventory balances of automotive fluid products with minimal installation and programming costs. Badger Meter has used its years of expertise in the automated meter reading market to develop a modular control system using RF communications.

The high end system hardware consists of one Master Keypad and at least one Dispense Keypad as well as at least one radio frequency (RF) electronic preset meter. The Master Keypad handles serial communication between the PC or a host server (ERP system) and RF communication to the Dispense Keypads in the system. The system verifies the operator's pin number and validates the work order number, fluid quantities and the valid hose/meter.

The Master Keypad can communicate with up to 36 Dispense Keypads that can be positioned to support the workflow of the facility the best way. Each Dispense Keypad can control up to 24 meters, for a total of 250 meters. The system supports up to 16 tanks and 16 fluids as a part of the system configuration. The system supports 250 unique operator IDs and pin numbers.

The system uses direct sequence spread spectrum RF technology to prevent communication problems with other equipment in the facility. The RF system will look for a clear channel for transmission to insure that there is reliable communications at all times. Communication distances are typically up to 100 meters, but can go up to 300 meters with unobstructed line-of-sight. A remote antenna is available for situations where multiple buildings are involved in the installation.

The PC is used to configure the system, maintain system data and enter work orders. The service desk would use the PC to enter a work order selecting the fluid and quantity required. The PC can stack as many work orders as required, limited only by the disk storage space of the PC. There is no need to predetermine where the work is going to occur. This allows the flexibility to service a vehicle at any open bay and select a meter when the work is going to be performed. When the work order is going to be performed, the service personnel simply enters their pin number, work order and hose that is going to be used at the Dispense Keypad.

There are a number of system utilization reports by user; fluid type, tank or meters available for the system's management.

Optionally, the system can be connected with an ERP or DMS system via its RS232 interface. The real-time communication is based on an open interface protocol (ASCII-code) and can be easily adapted to local conditions.

A unique, patented feature of the system is that the RF meter's dispense trigger is locked until an authorization from the keypad is received. After the dispense batch is completed, the user can top off if more fluid is required, the actual dispensed amount is sent back to the keypad and the meter returns to the locked status. Additionally, the meter can be installed on portable dolly systems offering control and monitoring of high-cost lubrication products.

System Overview

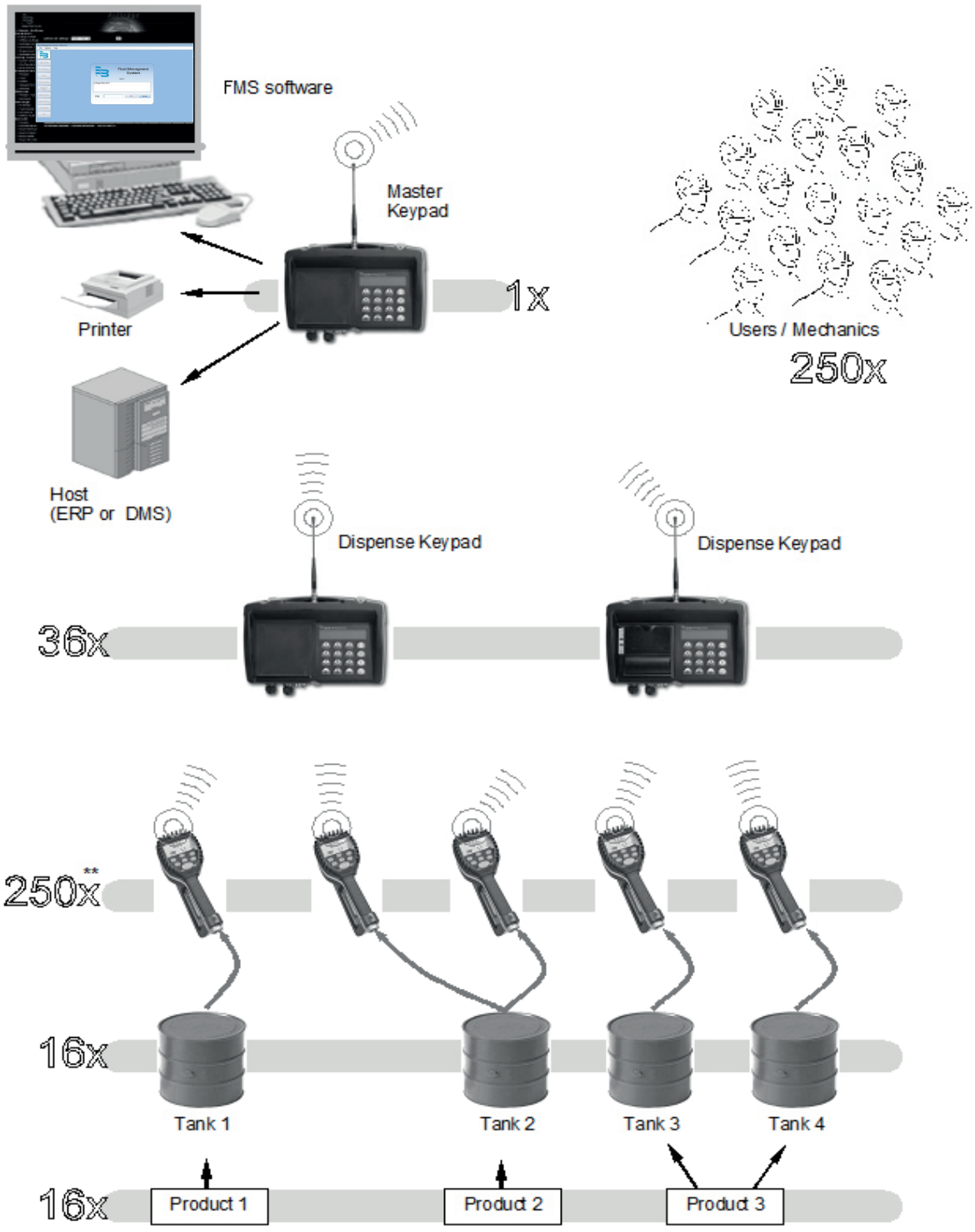


Figure 1: System Overview

System Composition and Dataflow

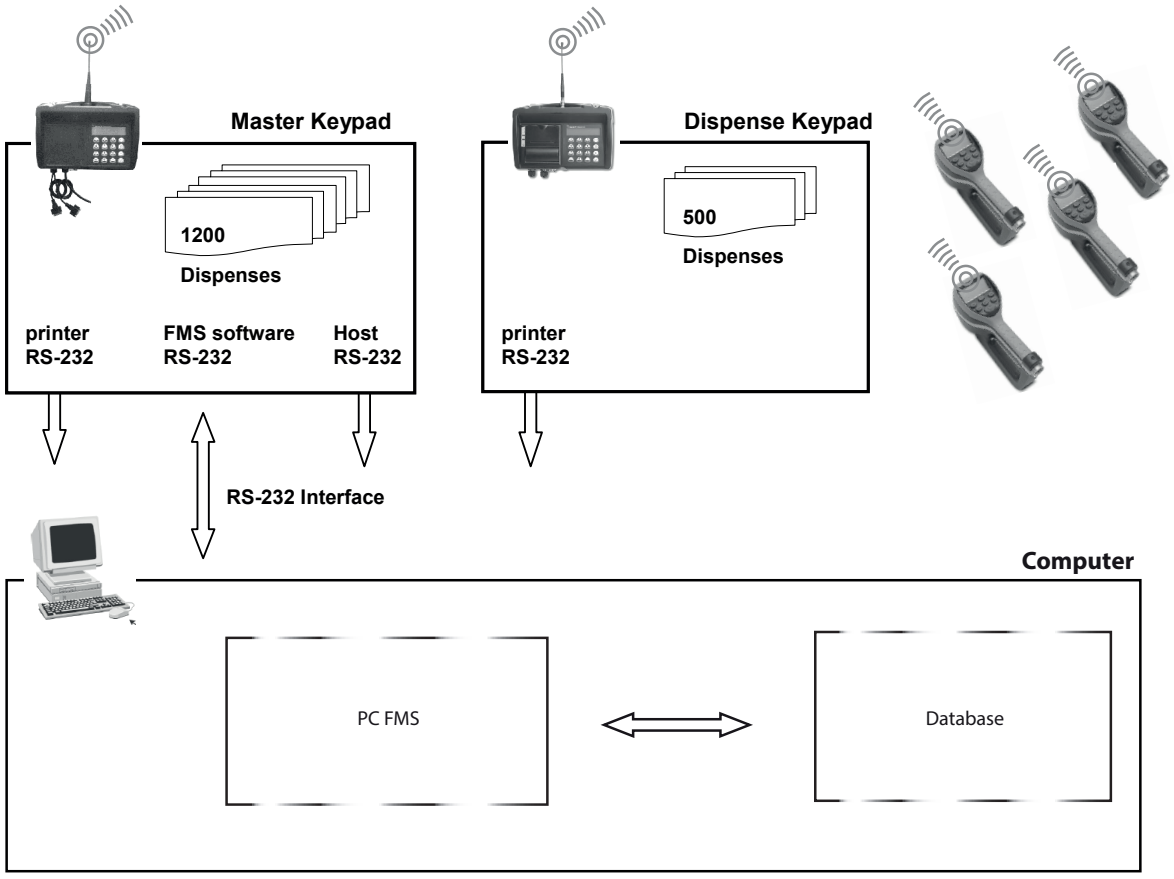


Figure 2: System Data Flow

The main data streams:

1. The LMS-RF software stores the configuration data into the database.
2. By using the *Initialize System* menu of the LMS-RF software the configuration data is processed to the Master Keypad and finally via radio to all Dispense Keypads.
3. The LMS-RF records all dispenses in the database.

Specifications

Power Requirements	120V AC 50/60 Hz
RF Communications	2-way, 2.4…2.5 GHz Direct Sequence Spread Spectrum
RF Network	Self-healing Mesh Network
Operating Temperature	14…140° F (–10…60° C)
Internal Printer	Thermal printer Type FT190 (optional)
External Printer	Epson LX300 or similar (optional)

Certification

- Contains FCC ID: S4GEM35XB
- Contains IC: 8735A-EM35XB
- FCC CERTIFIED, PART 15, SUB-PART C
- CE0681 EC-R&TTE Certified

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

⚠WARNING

TO SATISFY FCC RF EXPOSURE REQUIREMENTS FOR MOBILE TRANSMITTING DEVICES, A SEPARATION DISTANCE OF 20 CM OR MORE SHOULD BE MAINTAINED BETWEEN THE ANTENNA OF THIS DEVICE AND PERSONS DURING OPERATION. TO ENSURE COMPLIANCE, OPERATIONS AT CLOSER DISTANCES THAN THIS ARE NOT RECOMMENDED.

WALL-MOUNTING THE KEYPAD

The keypad should be mounted upright with the antenna pointing upward, near a 120V AC electrical socket, to a structurally sound wall through the two holes on the top of the keypad casing. Height on the wall should be at eye level. Care should be taken to avoid mounting behind any steel objects (tool storage cabinets and metal chain linked fences) that may block the RF communication signal. Care should also be taken to avoid direct, significant heat sources.

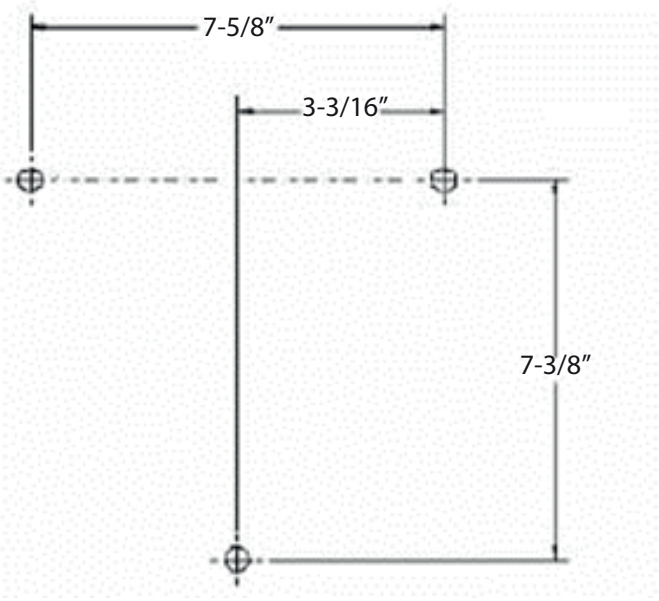


Figure 3: Mounting Dimensions for Keypad

Keypad Description

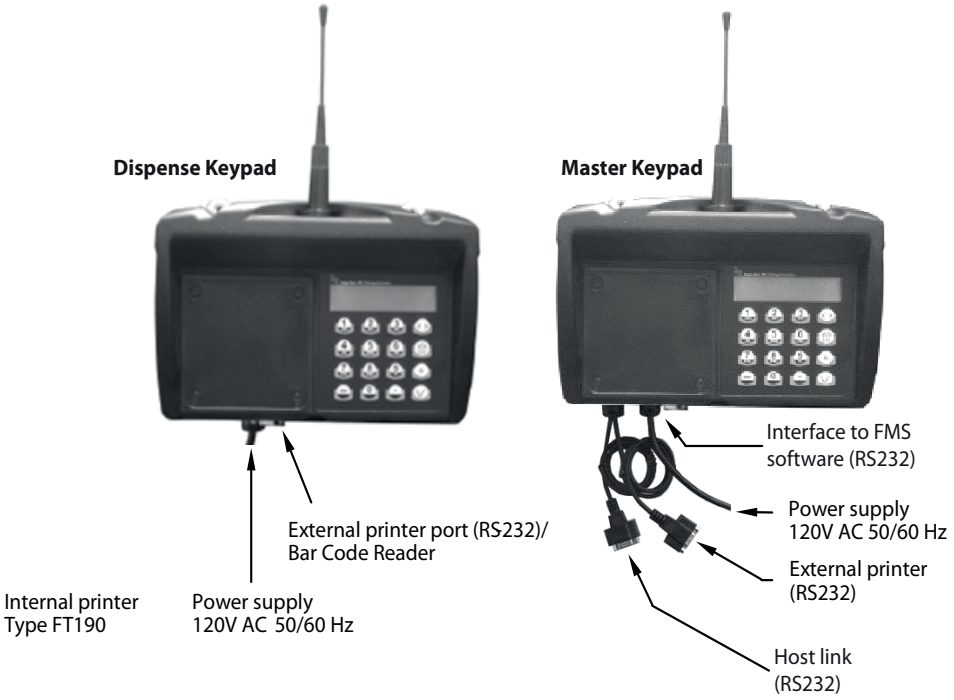

Dispense Keypad
Master Keypad
Interface to FMS software (RS232)
Power supply 120V AC 50/60 Hz
External printer (RS232)
Host link (RS232)
External printer port (RS232)/ Bar Code Reader
Internal printer Type FT190
Power supply 120V AC 50/60 Hz

Figure 4: Keypad description

The **SCROLL** key selects options on the active display.

The **HOME** key returns the display to the default screen.

The **BACKSPACE** key deletes one character to the left of the cursor each time it is pressed.

The **ENTER** key completes the current action then displays the next screen.

The **SPACE** key adds a blank space to the right of the data just entered.

The **Alphanumeric** keys enter numbers and alpha characters (letters).

- To enter a number, press and release a key.
- To enter a letter, press and hold the key until the letter you want displays, then release the key.

to

Operation Modes

The configuration of the system is generally done by using the PC-based LMS-RF Software. Only some special functions like the operation modes are set at the Master Keypad.

RF System with PC Operation Mode

In this mode the PC is used to configure the system entities and install the network. The PC will be used to enter work orders for processing and provide the queuing for future processing. When an operator processes a work order the PC will validate the work order number and provide the fluid and amount to be dispensed. The results of the dispense will then be stored on the PC.

RF System with Host Operation Mode

In this mode the PC is used to configure the system entities and install the network.

The host will be used to enter work orders for processing and provide the queuing for future processing. It will also store the dispense results that have been completed. Dispense results can be additionally stored on the PC. When an operator processes a work order the host will validate the work order number and provide the fluid and amount to be dispensed.

Standalone Mode

Work orders will not be validated; each entered work order will be accepted by the system. Data will be stored in the Master Keypad's memory.

NOTE: Each meter can only be associated to one Dispense Keypad. Only dispense and keypad supervisors can access each of the Dispense Keypads.

MASTER KEYPAD

The Master Keypad acts as the communications director for the RF communications. It handles all communications between the Dispense Keypads and the PC or Host. There are no operator menus associated with the Master Keypad—only supervisor menus for setting up the system or creating reports.

The remainder of this document shows only the actual display, not the entire keypad.

To gain access to the supervisor menus, the supervisor PIN has to be entered. The default PIN is 0001 at initial power-up.

System Version Screen

The standard screen shows the system date and software version number. The display will alternate between the standard screen and the *Enter Pin Number* screen. The *Enter Pin Number* screen is used to access the supervisor menus.

NOTE: An "N" displayed in the lower left-hand corner of the system version screen indicates a Radio Network error. See *"Radio Status" on page 17* to check the source of the error.

Settings Overview / Supervisor Menus

The following changes can only be made at the Master Keypad in the setup mode. All other settings can be changed by using the LMS-RF software.

Enter PIN Number

To access the setup mode:

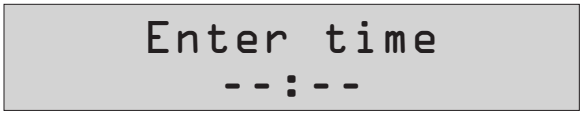
Enter the supervisor PIN number and press **ENTER**.

The default PIN is 0001 at initial power-up.

Initialization (INI) Menu

The *INI* menu is used to set the system's date and time.

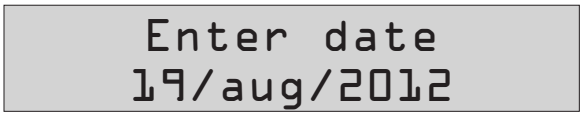
Set System Time



To change or set the system time:

1. Select the **INI** menu and press **ENTER**.
2. Use the numeric keys to set a 24-hour military time of day.
3. Press **ENTER** to save the setting and advance.

Set System Date

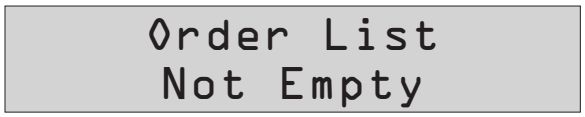


To change or set the system date:

1. Use the numeric keys to enter the two-digit day. The cursor automatically moves to the month.
2. Press the **SCROLL** key to select a month.
3. Use the numeric keys to enter the four-digit year.
4. Press **ENTER** to save the setting.

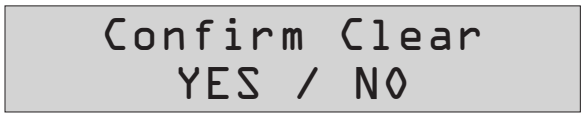
Configuration (CNF) Menu

The *CNF* menu is used to set the system's operation modes and archiving methods.



If you see the message "Order List Not Empty," you have to clear the transactions in the Master Keypad (CNF Menu).

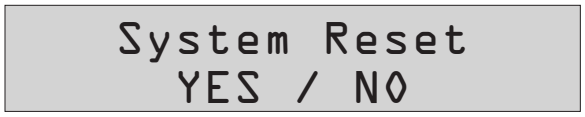
Use the **SCROLL** key to move the cursor to either **YES** or **NO** and press **ENTER**.



Use the **Scroll** key to move the cursor to either **YES** or **NO** and press **ENTER**.

System Reset

The *System Reset* allows a supervisor to reset all configuration parameters to default values.



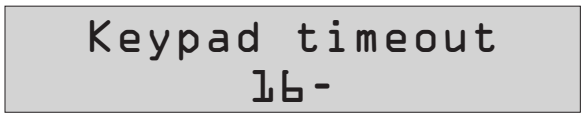
1. Use the **SCROLL** key to move the cursor to either **YES** or **NO**.

   a. If you select **YES**, the keypad asks you to Confirm Reset.
   b. If you select **NO**, the keypad advances.

3. Press **ENTER**.

Keypad Timeout

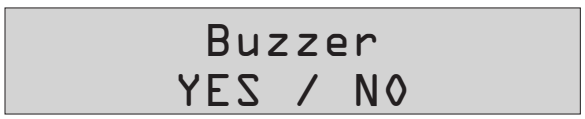
- Timeout parameter corresponds to the time it takes to validate after all dispense order data has been entered. If the Enter button is not pressed within the time allocated, the keypad display goes back to initial menu and the input data is erased.
- The Keypad Timeout is between zero to 255 seconds (0 = no timeout) and the default for this feature is 10 seconds.



1. Press the **BACKSPACE** key to erase the current setting.
2. Type in the new setting.
3. Press **ENTER** to advance.

Buzzer

This screen provides a user with the option to have a beep on every key entry. The default is YES.



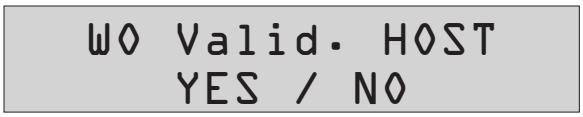
1. Use the **SCROLL** key to move the cursor to **YES** or **NO**.
2. Press **ENTER** to advance.

Work Order Validation

WO validation is used to define if a work order shall be validated by the system before processing it.

Host Validation (Host Operation Mode)

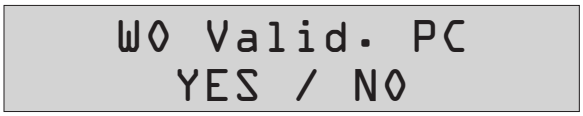
In this mode the work order number will be sent to the ERP (DMS) system. Only after validation from the system the meter will unlock. Afterwards the dispense data will be sent to the ERP system.



1. Use the **Scroll** key to move the cursor to either **YES** or **NO**.
2. Press **ENTER**.

PC Validation (PC Operation Mode)

In this mode the work order number will be sent to the PC (LMS-RF Software). Only after validation from the PC will the order number is accepted.



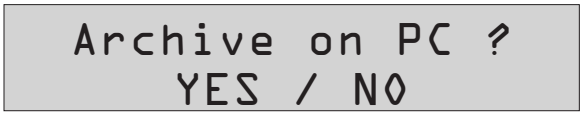
1. Use the **SCROLL** key to move the cursor to either **YES** or **NO**.
2. Press **ENTER**.

WO Archive (Printout or Storing of the Work Order /Dispense Results)

1. Use the **SCROLL** key to move the cursor to your selection.
2. Press **ENTER**.

Mem	Data stored in an optional memory module.
Print	After each dispense, the data will be printed out on the external printer. Each line displays one dispense.

Archive on PC (Archive of the Work Orders/Dispenses)



1. Use the **SCROLL** key to move the cursor to either **YES** or **NO**.
2. Press **ENTER**.

All dispense results are stored on the PC (LMS-RF Software). If the PC is currently not available, the data will be tagged as "not sent" in the memory of the master. The data will be sent as soon as the PC is connected again.

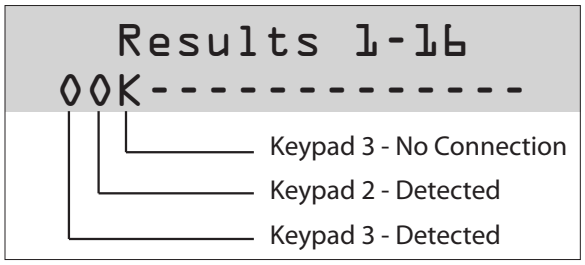
Test Communication (DK) Menu

The *DK* menu is used to check the communication between all keypads.

Use the **Scroll** key to move the cursor to either **YES** or **NO** and press **ENTER**.

Three Dispense Keypads are set up in the following example. Each "–" (dash) stands for a Dispense Keypad.

Press **ENTER** to begin the test.



N=Network Error, T=Timeout

Three Dispense Keypads are set up in this example.

In the following examples, each "–" (dash) stands for a Dispense Keypad. Press **ENTER** to display these results.

Reports (REP) Menu

- Connect a printer or a PC (Terminal program) to the serial printer port (RS232).
- Settings are 9600 Baud, Data Bits 8, Stop Bits 1, Parity ODD.
- Reports will automatically be stored in the data logger (RF memory) at the Master Keypad.

To use this feature you must the select External Printer option in the *CNF* menu.

The *REP* menu is used to print reports to an external printer.

Use the **SCROLL** key to move the cursor to the report you want to print and press **ENTER**.

The options are:

INI	Initialization	**USR**	Sort list by user
CNF	Configuration	**PRO**	Sort list by product
WO	Sort list by work order	**HOS**	Sort list by hose (meter)
COM	Display the communication status of hoses/meters.	**TNK**	Sort list by tank

Radio (RAD) Menu

The *RAD* menu screens are:

- Address (ADR) toggles the display between the Radio Address and the Radio Prefix screens.
- Network (NWK) allows you to select the Radio Network.
- Power (PWR) displays the radio's transmit (Tx) output power.
- Status (STA) displays the Radio Network Status.
- Change Channel (CHA) allows you to select a different RF channel.

1. Use the **SCROLL** key to move the cursor to **REP**.

2. Press **SCROLL** two more times to move the cursor to the **RAD** selection.
3. Press **ENTER** to display the *RAD* screen.

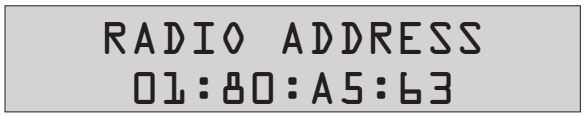
4. Use the **SCROLL** key to move the cursor to the information you want to display.
5. Press **HOME** to go back to the default screens.

Radio Address/Radio Prefix

Once you select **ADR**, you can use the **Scroll** key to toggle between the *Radio Address* and the *Radio Prefix* screens.

1. Use the **SCROLL** key to move the cursor to **ADR**.

2. Press **SCROLL** again to display the *Radio Prefix* screen.



3. Press **ENTER** to display the *Radio Address* screen.
4. Press **ENTER** to return to the selection screen.

Radio Network

The *Radio Network* default is zero. You need to change this setting only if you have multiple RF LMS-RF systems. All RF Meter/Hose *Radio Network* settings must match the Master Keypad and Dispense Keypad settings.

1. Use the **SCROLL** key to move the cursor to **NWK**.
2. Press **ENTER** to display the *Radio Network* screen.

3. Press **ENTER** to return to the selection screen.

Radio Power

1. Use the **SCROLL** key to move the cursor to **PWR**.
2. Press **ENTER** to display the *Radio Power Level* screen.
3. Press **ENTER** to return to the selection screen.

Radio Status

The Radio Status options are:

- NWK CONNECTED – The network is connected and operational.
- SERIAL ERROR – There is a radio communication error on the serial bus between the keypad and the radio.

1. Use the **SCROLL** key to move the cursor to **STA**.
2. Press **ENTER** to display the *Radio Status* screen.
3. Press **ENTER** to return to the selection screen.

Change Channel

The Change Channel option is used to select a different RF channel if the current channel is noisy.

1. Use the **SCROLL** key to move the cursor to **CHA**.
2. Press **ENTER** to display the *Radio Network* screen.
3. Press **ENTER** to select a new channel.
4. The screen displays the radio command status.

DISPENSE KEYPAD

The Dispense Keypads are responsible for the communication with the RF meters. The user starts a work order from the keypad. After the dispense operation has been completed the keypad will receive the actual amount dispensed from the meter. The Dispense Keypad then sends the dispense results to the Master Keypad.

The system can handle up to 36 Dispense Keypads. Up to 24 meters can be assigned to each keypad but each meter can only be assigned to one Dispense Keypad.

System Version Screen

The standard screen shows the system software version number. The display will alternate between the standard screen and the *Enter Pin Number* screen. The *Enter Pin Number* screen is used to access the supervisor menus.

NOTE: An "N" displayed in the lower left-hand corner of the system version screen indicates a Radio Network error. See *"Radio Status" on page 23* to check the source of the error.

NOTE: An "M" displayed in the lower left-hand corner of the system version screen indicates that the Dispense Keypad has joined an RF network, but cannot currently contact the Master Keypad for WO authorization.

NOTE: An "O" displayed in the lower left-hand corner of the system version screen indicates that the Dispense Keypad is in *System Override* mode. See *"System Override (SYS) Menu" on page 24* for details.

Enter a user PIN to start a work order or the supervisor PIN to enter the supervisor menus (the default PIN is 0001).

Settings Overview / Supervisor Menus

The following configuration options are only available at the Dispense Keypad.

The default value for the Supervisor PIN is 0001.

Configuration (CNF) Menu

The *CNF* menu is used to set the system's operation modes and archiving methods.

System Reset

Resets the system parameters to the original factory settings.

Mileage Type

Defines the unit for the *Free Alphanumeric* field (Defined in Global Keypad Settings)

Top Off Timer

Specifies the amount of time, how long user can make additional dispenses. Is the time allowed after a dispense is completed before the meter will automatically lockout and send the dispense results back. (Defined in Global Keypad Setting)

Internal Printer

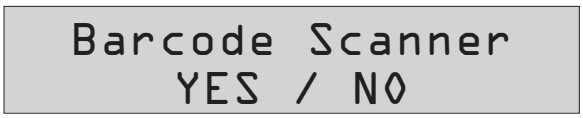
Enables the internal ticket printer. (Defined in Global Keypad Settings)

External Printer

Enables the external report printer port. (Defined in Global Keypad Settings)

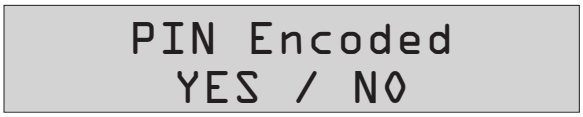
Barcode Scanner

This menu will define the external Printer port as a Barcode Reader Port (RS232), if the *External Printer* is enabled the *Barcode Scanner* menu will disappear.



Select **YES** to enable the Barcode Scanner.

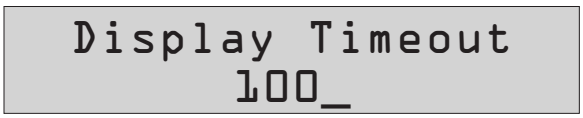
OFF	Data can be entered with Keypad & Barcode Scanner
PIN	PIN has to entered by Barcode Scanner
All	All data has to be entered with Barcode Scanner



When PIN or All is selected you can choose an additional prefix character. The prefix character will not be displayed and cannot be entered on the keypad.

Choose the desired prefix, available characters are:

$ % &´ ( ) * +, - Space / : ; < = > ? @ [ ] ^ ` { | } ! ”



Defines the time, how long the scanned information will be shown on the display in units of 1/10 second. For example, 100 = 1 second.

We recommend the following barcode scanners:

- Wall mounted: Datalogic Magellan 1000i
- Handheld: Datalogic Gryphon 4100

The scanner has to be programmed according to our specification. Null modem adapter has to be used between the keypad serial port and the barcode scanner.

Buzzer

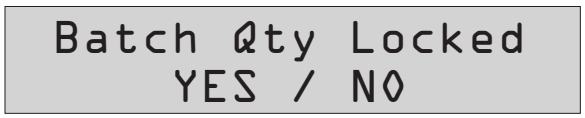
The buzzer beeps each time you press a button. You can turn off the sound. See Global Keypad Settings.

Auto Override

Activates the system *Auto Override* feature in all keypads so users can dispense WOs when the Master Keypad is not operational. No supervisor intervention is required. Available with v3.X firmware only. After five failed MK communication attempts, the *Auto Override* feature automatically puts the keypad in system override mode.

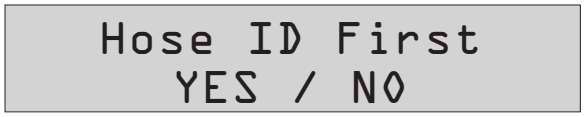
1. Use the **SCROLL** key to move the cursor to either **YES** or **NO**.
2. Press **ENTER**.

Batch Quantity Locked



With the *Batch Quantity Locked*, you *cannot change* the batch quantity that was entered on the work order. If the work order has a batch quantity of zero, you *can change* the batch quantity.

Hose ID First



Used for HOST communication option only.

Selected product ID will be sent to the HOST.

Delete Prepared WOs (MET) Menu

Work orders that have been entered at a keypad are stored until they are picked up by the appropriate meter (by pressing **RESET** at the meter). Meanwhile, the meter is locked for other dispenses.

The *MET* menu is used to delete prepared work orders and release the meter for new work orders.

1. Use the **Scroll** key to move the cursor to either **YES** or **NO**.
2. Press **ENTER**.

3. Press **ENTER**.

Reports (REP) Menu

- Connect a printer or a PC (Terminal program) to the serial printer port (RS232).
- Settings are 9600 Baud, Data Bits 8, Stop Bits 1, Parity ODD.
- Reports are automatically stored in the data logger (RF-memory) at the Master Keypad.

To use this feature, you must the select External Printer option in the *CNF* menu.

The *REP* menu is used to print reports from an external printer.

Use the **SCROLL** key to move the cursor to the report you want to print and press **ENTER**.

The options are:

INI	Initialization	**USR**	Sort list by user
CNF	Configuration	**PRO**	Sort list by product
MET	Sort list by meter	**HOS**	Sort list by hose (meter)
WO	Sort list by work order	**TNK**	Sort list by tank

190 (Internal Ticket Printer) Menu

Use this menu to print the configuration and status reports from the internal printer FT 190 (optional).

To use this feature, you must the select Internal Printer option in the *CNF* menu.

The *190* menu is used to print reports from an internal printer.

Use the **SCROLL** key to move the cursor to the report you want to print and press **ENTER**.

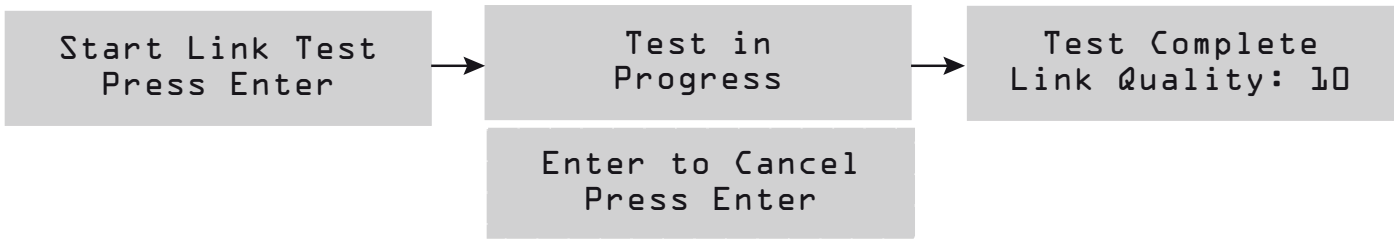
The options are:

INI	Initialization	**MET**	Sort list by meter
CNF	Configuration	**WO**	Sort list by work order

RF Communication Test (LNK) Menu

The *LNK* Menu is used to check the quality of the RF communication between the Master and Dispense Keypads.

The test performs a number of test communications and measures the quantity of lost transmissions. The *Link Quality 10* is the maximum you can achieve.



Radio (RAD) Menu

The *RAD* menu screens are:

- Address (ADR) toggles the display between the Radio Address and the Radio Prefix screens.
- Network (NWK) allows you to select the Radio Network.
- Power (PWR) displays the radio's transmit (Tx) output power.
- Status (STA) displays the Radio Network Status.
- Network Connect (CON) connects the keypad to a new Master Keypad network.

1. Use the **SCROLL** key to move the cursor to **REP**.

2. Press **SCROLL** two more times to move the cursor to the **RAD** selection.
3. Press **ENTER** to display the *RAD* screen.

4. Use the **SCROLL** key to move the cursor to the information you want to display.
5. Press **HOME** to go back to the default screens.

Radio Address/Radio Prefix

Once you select **ADR**, you can use the **Scroll** key to toggle between the *Radio Address* and the *Radio Prefix* screens.

1. Use the **SCROLL** key to move the cursor to **ADR**.

2. Press **SCROLL** again to display the *Radio Prefix* screen.

3. Press **ENTER** to display the *Radio Address* screen.
4. Press **ENTER** to return to the selection screen.

Radio Network

The *Radio Network* default is zero. You need to change this setting only if you have multiple RF LMS-RF systems. All RF Meter/Hose *Radio Network* settings must match the Master Keypad and Dispense Keypad settings.

1. Use the **SCROLL** key to move the cursor to **NWK**.
2. Press **ENTER** to display the *Radio Network* screen.

3. Press **ENTER** to return to the selection screen.

Radio Power

1. Use the **SCROLL** key to move the cursor to **PWR**.
2. Press **ENTER** to display the *Radio Power Level* screen.

3. Press **ENTER** to return to the selection screen.

Radio Status

The *Radio Status* options are:

- NWK CONNECTED – The network is connected and operational.
- SERIAL ERROR – There is a radio communication error on the serial bus between the keypad and the radio.
- NWK DOWN – There is no network within the range of the Dispense Keypad.
- NWK LOST – The network connection is currently unavailable.

1. Use the **SCROLL** key to move the cursor to **STA**.
2. Press **ENTER** to display the *Radio Status* screen.

3. Press **ENTER** to return to the selection screen.

Network Connect (CON) Menu

The *Network Connect* forces the keypad to connect to a new Master Keypad network. This option is used when:

- Replacing the Master Keypad.
- Moving the Dispense Keypad if the Dispense Keypad does not automatically find the new network.

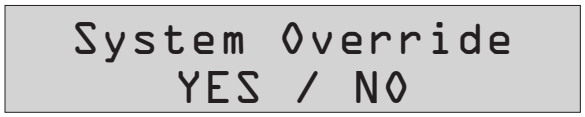
1. Use the **SCROLL** key to move the cursor to **CON**.
2. Press **ENTER** to display the *Radio Network* screen.

3. Press **ENTER** to display the *Radio Status* screen.

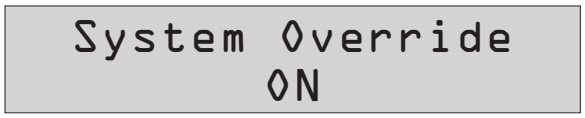
4. The screen displays the radio connection status (NWK CONNECTED or NWK DOWN).

System Override (SYS) Menu

The *System Override* Menu is used to override verification of the Master Keypad.

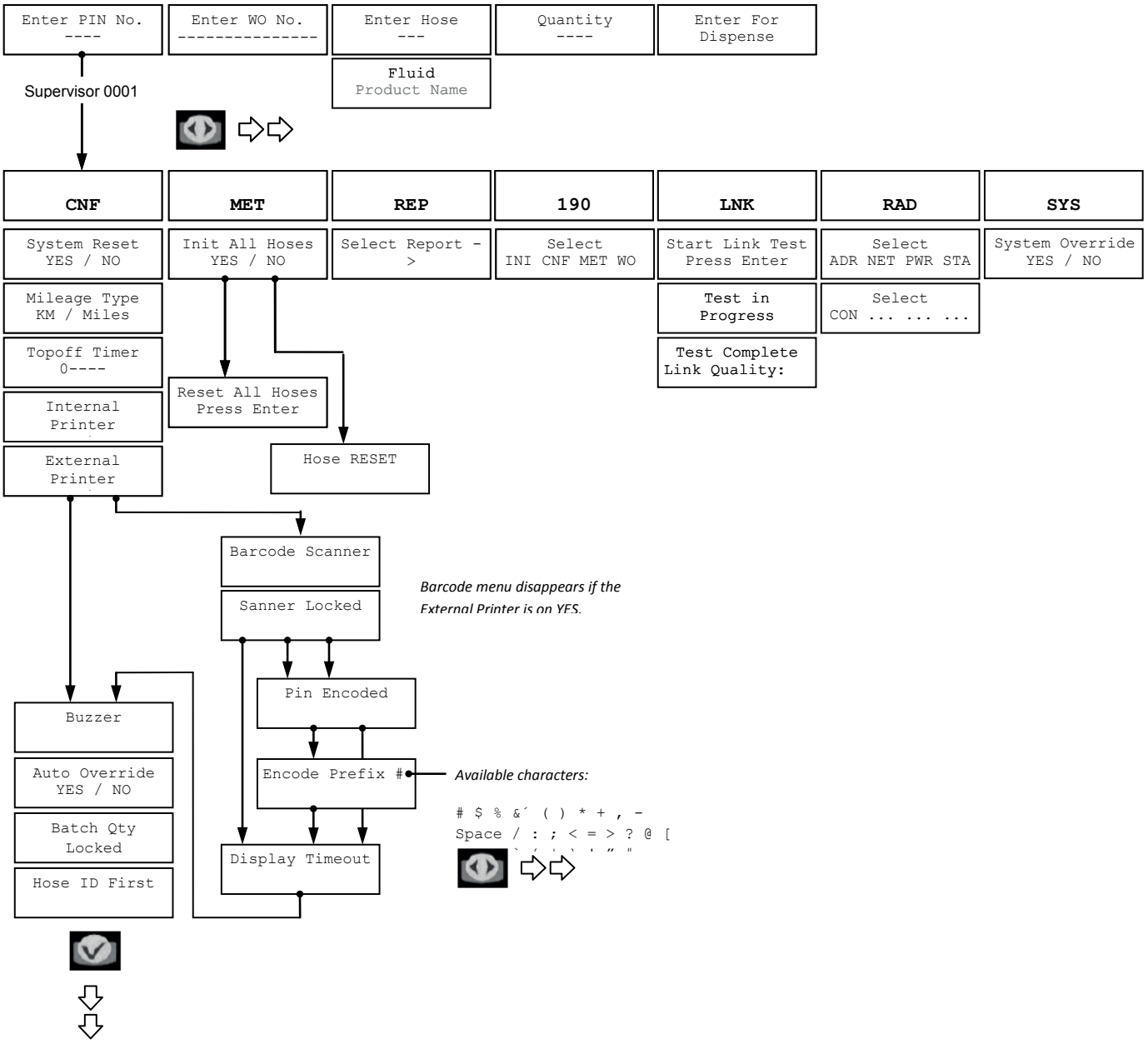


1. Use the **SCROLL** key to move the cursor to **YES**.
2. Press **ENTER**.



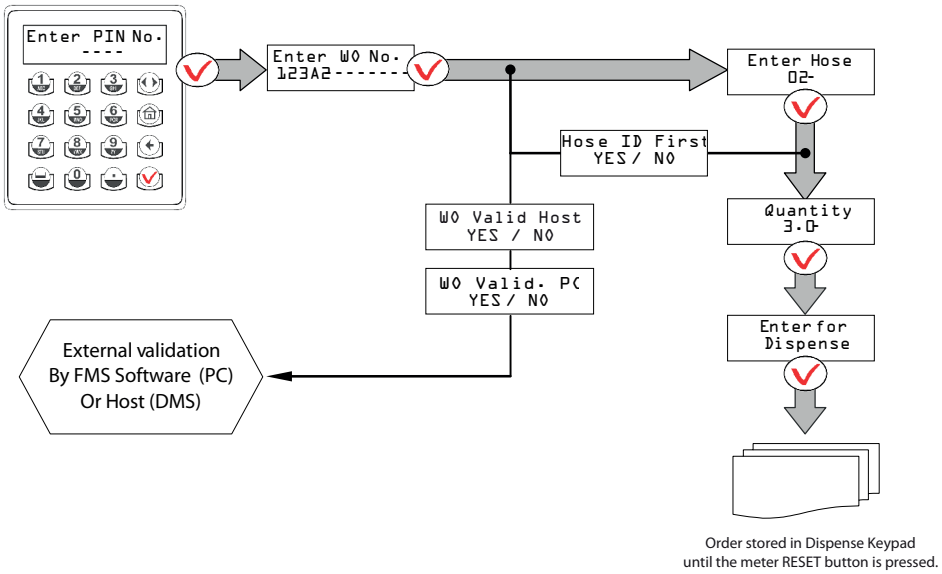
The screen verifies that *System Override* is On.

Dispense Keypad Menu Overview



DISPENSE PROCESS

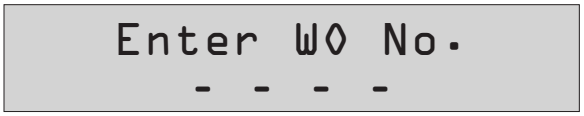
Schematic Overview



Starting a Work Order

1. Enter your PIN number and press **ENTER**.

To start a work order, the mechanics or users must enter their PIN to access the system.



2. Enter an alphanumeric number (max. 16 characters) and press **ENTER**.

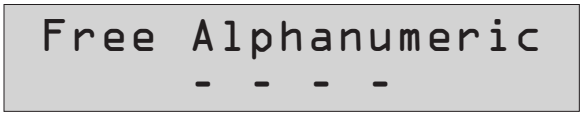
In the operation modes *WO Validation HOST* or *WO Validation PC* (see *"Work Order Validation" on page 13*) the entered WO number will be compared with the numbers set in the system, which are defined in Global Keypad Settings.

Alphanumeric Keypad

To change from the numeric to the letter keypad, press the equivalent key for at least 3 seconds until the desired letter is shown.

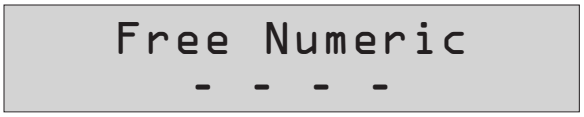
Additional Free Fields

These optional fields are only shown if they have been enabled (defined in Global Keypad Settings).



3. Enter alphanumeric characters and press **ENTER**.

Can be used, for example, for the licences plate number.

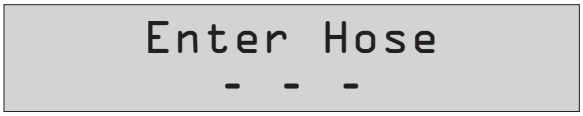


4. Enter an alphanumeric number (max. 16 characters) and press **ENTER**.

Can be used, for example, for the actual mileage.

Meter Selection

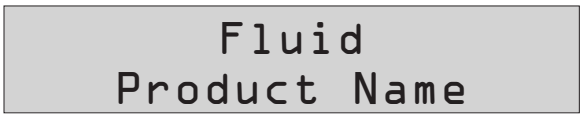
Enter a preset meter (hose) ID for the product.



5. Enter a preset meter (hose) ID for the fluid product you want and press **ENTER**.

- Only meters that are assigned to the current keypad can be selected.
- In the operation modes *WO Validation HOST* or *WO Validation PC* the system will check if the product you entered is assigned to this work order.

Display Fluid



6. The chosen fluid type is displayed for three seconds.

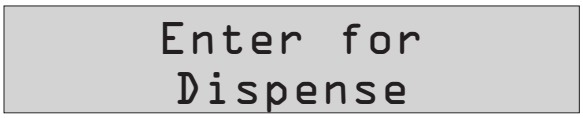
Product Quantity

7. Enter the desired quantity and press **ENTER**.

   Optionally, the quantity assigned to this WO is shown.

- The quantity can be chosen between 0.0…99.9 and 100…999 units of measure.
- The preselection can be made with one decimal place.
- For quantities more than 100 units of measure, the meter counts down toward zero.
- A quantity of 0.0 will deactivate the preselection on the RF meter. The RF meter will not latch and the user is required to hold the trigger in the open position to dispense fluid. The user must press **RESET** on the RF meter to complete the dispense operation and communicate the dispense order result to the keypad.

Dispense Confirmation



8. Press **ENTER** to dispense the fluid.

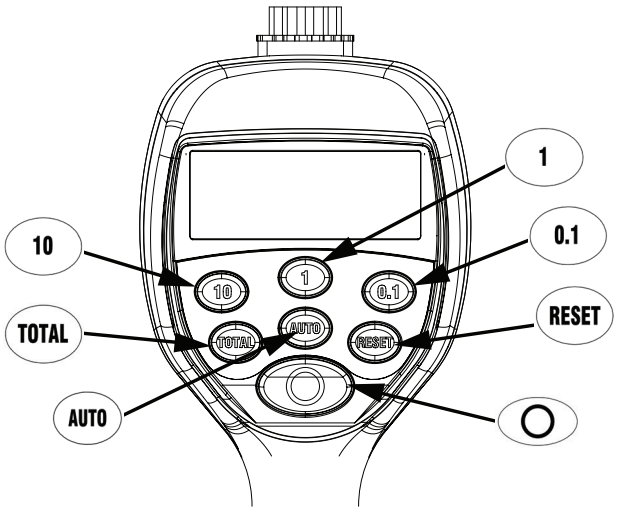
   The work order is now ready for being picked up by the RF meter (see RF Mode, Standard Preselection Mode) .

RF METER

The meter is equipped with RF communications to communicate dispense authorization and result information. Once a work order has been set up, the operator simply pulls the trigger and the authorized amount of fluid for that meter will dispense. The valve will automatically shut off when the full quantity has been dispensed. A *Top Off* feature allows additional quantities to be dispensed and tracked after the valve closes. Upon completion of the dispense effort, the valve locks, prohibiting any unauthorized dispense.

Key Description

The following keys (except for RESET and SHUT-OFF) are only active in the AUTO mode (or Manual mode).



10, 1, 0.1 Used to enter the dispense quantity to be used. In operational mode it shows the five latest dispensed amounts.

TOTAL Used to display the accumulated total of fluid dispensed, as well as the resettable total when held for 3 seconds.

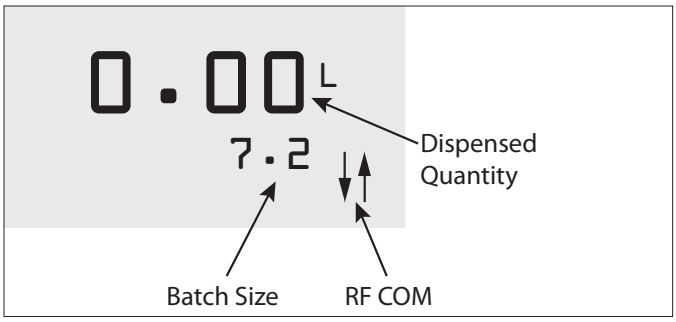
AUTO Used to enter and exit the auto mode when RF communications are not available.

RESET
- Used to accept a dispense order from the keypad.
- Used in normal operating mode (RF, manual or auto) to clear the previously programmed batch and to reset the meter.
- Used to reset the resettable total dispensed while pressing the TOTAL button.

SHUTOFF or **STOP** Used to stop the flow manually through an electrical override.

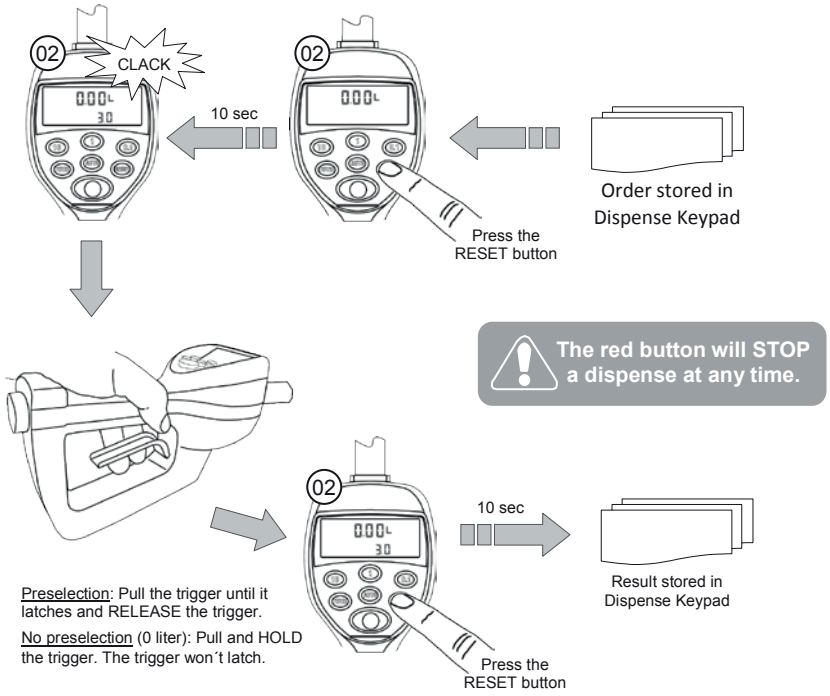
RF Mode (Standard Pre-Selection Mode)

Work Order Validation via the Dispense Keypad



When the battery pack is attached to the meter, the meter will automatically enter the RF mode. The trigger is in a locked-out position and no oil can be dispensed until a dispense order is received by the meter.

1. Press the **RESET** button on the meter to enable it to receive a dispense order provided by the Dispense Keypad. The trigger will unlock.
2. Pull the trigger to begin the dispensing of fluid. The valve will automatically lock in place, even though the trigger will fall back to the closed position. The flow will automatically shut off when the programmed amount has been dispensed.
3. To top off, pull the trigger to dispense fluid and release when the desired amount has been reached.
4. Press the **RESET** button when finished. The total quantity will be transmitted to the keypad and the meter will return to a locked-out position. The meter is now ready to receive the next dispense order from the keypad.


02
CLACK
10 sec
02
Order stored in Dispense Keypad
Press the RESET button
The red button will STOP a dispense at any time.
Preselection: Pull the trigger until it latches and RELEASE the trigger.
No preselection (0 liter): Pull and HOLD the trigger. The trigger won´t latch.
02
10 sec
Result stored in Dispense Keypad
Press the RESET button

AUTO Mode (Autonomous)

IMPORTANT

This function allows unauthorized dispenses. The dispense information will not be associated to any mechanic or operator.

- The total dispensed quantity will be stored under the general work order number (999999).
- The AUTO sign at the display's lower left corner indicates the manual mode.

Enter the AUTO Mode

To enter the AUTO Mode:

1. Press and hold the **TOTAL** button.
2. Press the following buttons one after the other: **10**, **1**, **0.1**, **AUTO**.

You can use this same button sequence to return to RF mode.

The solenoid will now unlock and the meter may be used as a normal preselection meter.

3. Press the **AUTO** button to enter the preselection.

Reset to Standard Mode

To return the meter to the standard preselection mode, press the **RESET** button and start a communication with the assigned dispense (see *"Network Connect (CON) Menu" on page 24* and *"RF Mode (Standard Pre-Selection Mode)" on page 29*.

If the communication was successful (no "F02" error code) the meter will lockout and fall back in the preselection mode. The total quantity, which has been dispensed during the AUTO mode, will be automatically transmitted to the Master Keypad. It will be assigned to *Misc. WO-Number* (default 999999), with the user named as "???". The dispense result will be marked with the *Status 16* for manual dispense.

Electrical Override

In case of an emergency or to interrupt a batch, the meter is equipped with an electrical override. This option automatically closes the valve in the meter, stopping the flow immediately. The display will begin to flash because the meter does not sense any flow. Batching can be continued after an override, even if the meter is in the middle of a programmed batch and the display continues to flash.

1. Press the red **SHUTOFF** button to activate the electrical override. This button can only be used when the valve is open.
2. Press the **RESET** button to cue up the next batch and stop the display from flashing.

Changing the Battery

When the batteries need changing, a progression of warnings appears on the meter screen.

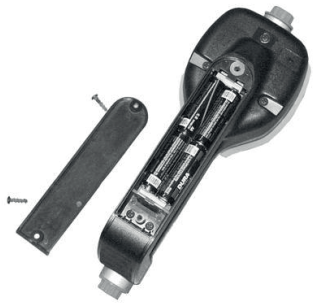
First Warning

The Low Battery icon appears in the lower left corner of the display. That means the batteries are low and need to be changed when the icon appears.

Second Warning

The Battery icon flashes. The battery power is too low and meter functions are disabled.

The battery compartment is located in the lower case on the backside of the trigger guard.



1. Position the unit face down.
2. Unscrew the two screws. Remove the battery door to expose the batteries.
3. Replace the old batteries with 4 AA alkaline batteries.

   NOTE: Battery polarity markings are inside battery compartment.
4. Dispose of used batteries properly, according to local regulations.

   NOTE: Changing the batteries does **not** affect any of the programmed values or totals.

Programming the RF Meter

The units of measurement and scale factor can be changed. For instructions, see the *RF Meter Installation and Operation Manual*.

INSTALLING AND LAUNCHING THE LMS-RF SOFTWARE

The system configuration is done by using this LMS-RF Software. Only some special functions like the operation modes are set at the Master Keypad.

The software provides the ability to set work orders, and assign a product and a quantity to it.

All dispense results will be collected and saved in a work order list (W.O. Report). Several filters are available to select the desired information. The result can be exported to a semicolon separated value (CSV) file format.

System Requirements

- P4 1.6 GHz or greater
- 1 GB RAM minimum
- XP, Vista, or Windows® 7, Server 2003, Server 2008 Required (will not run on Windows 2000 or earlier) 64 and 32-bit compatible

LMS-RF Software Description

Before beginning the installation, please be sure your Windows user profile has the appropriate rights to install the software properly (particularly Windows XP).

Insert the setup CD ROM into your CD ROM drive.

If the Installer does not launch itself after a short period, open it manually by double clicking on your CD Drive in your My Computer folder. Select the **AutoMenu.exe** file.

The installer menu will appear:

The installer menu provides several options:

- Server – installs the server and all server components. This will be the location where all the master keypad is plugged in, data is stored and where the client machine will go to access and update work orders, tank levels, etc.
- Client – installs the client and all client components. This will have to be installed on every machine you would like to run the software on
- Exit closes the installer

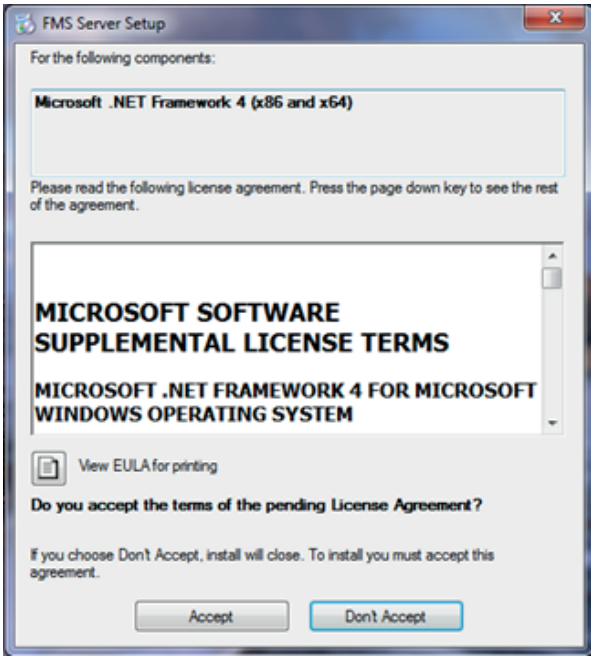
Installing the LMS-RF Server

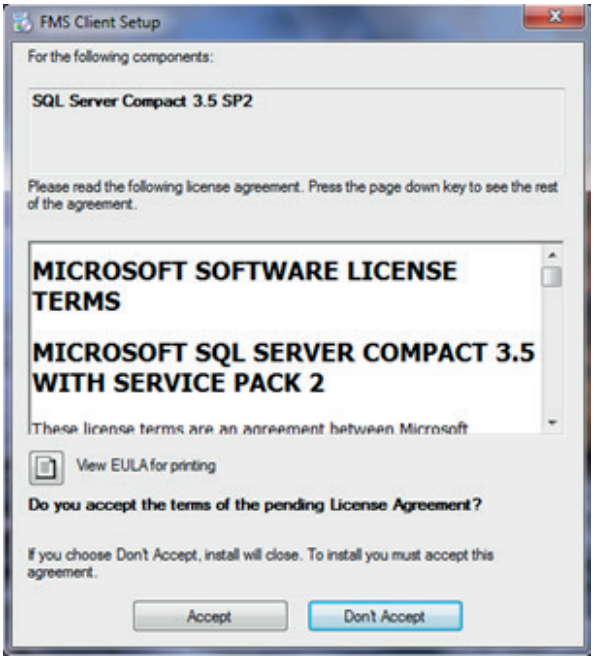
1. Select **Install Server**.
   If the .NET 4.0 Framework or SQL Compact Edition is already installed, they will be skipped. If the .Net 4.0 Framework is not installed, the installer will appear.

2. Click **ACCEPT**.
   If the SQL Compact Edition is not installed, the installer will appear.

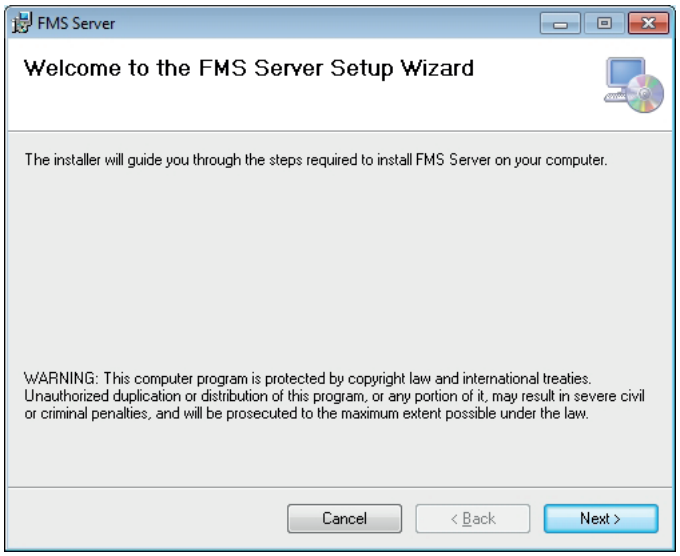
3. Click **ACCEPT**.

The Framework and/or SQL Compact Edition installation will take several minutes. The screens appear in the following order:

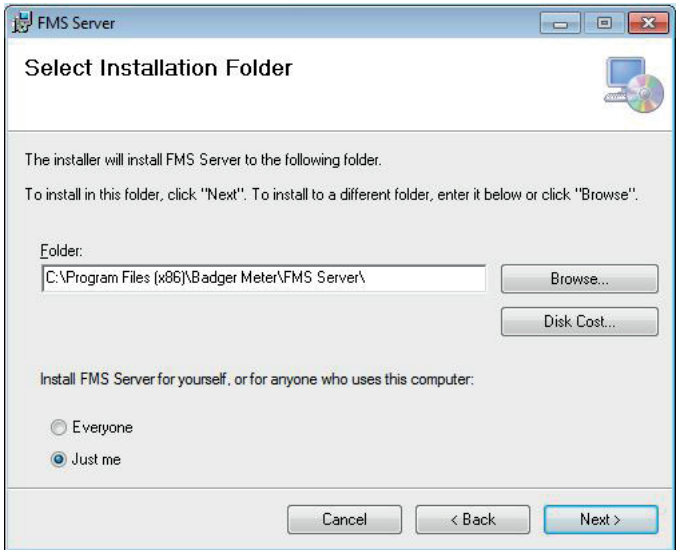

FMS Server Setup
For the following components:
Microsoft .NET Framework 4 (x86 and x64)
Please read the following license agreement. Press the page down key to see the rest of the agreement.
MICROSOFT SOFTWARE SUPPLEMENTAL LICENSE TERMS
MICROSOFT .NET FRAMEWORK 4 FOR MICROSOFT WINDOWS OPERATING SYSTEM
View EULA for printing
Do you accept the terms of the pending License Agreement?
If you choose Don't Accept, install will close. To install you must accept this agreement.
Accept
Don't Accept


FMS Client Setup
For the following components:
SQL Server Compact 3.5 SP2
Please read the following license agreement. Press the page down key to see the rest of the agreement.
MICROSOFT SOFTWARE LICENSE TERMS
MICROSOFT SQL SERVER COMPACT 3.5 WITH SERVICE PACK 2
View EULA for printing
Do you accept the terms of the pending License Agreement?
If you choose Don't Accept, install will close. To install you must accept this agreement.
Accept
Don't Accept

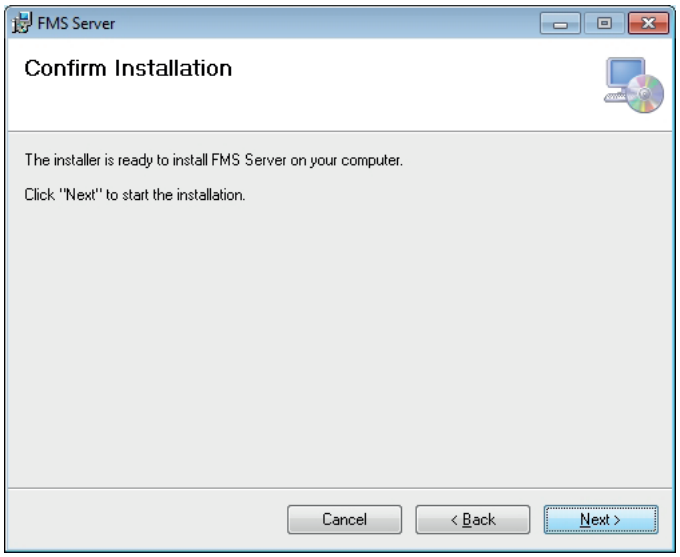
After the prerequisites are installed, the LMS-RF Server Setup Wizard appears:


FMS Server
Welcome to the FMS Server Setup Wizard
The installer will guide you through the steps required to install FMS Server on your computer.
WARNING: This computer program is protected by copyright law and international treaties. Unauthorized duplication or distribution of this program, or any portion of it, may result in severe civil or criminal penalties, and will be prosecuted to the maximum extent possible under the law.
Cancel
< Back
Next >

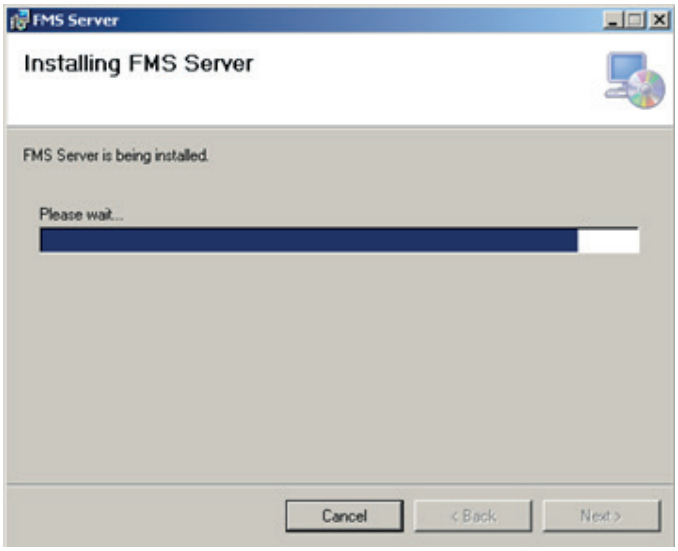
1. Click **NEXT**.


FMS Server
Select Installation Folder
The installer will install FMS Server to the following folder.
To install in this folder, click "Next". To install to a different folder, enter it below or click "Browse".
Folder:
C:\Program Files (x86)\Badger Meter\FMS Server\
Browse...
Disk Cost...
Install FMS Server for yourself, or for anyone who uses this computer:
Everyone
Just me
Cancel
< Back
Next >

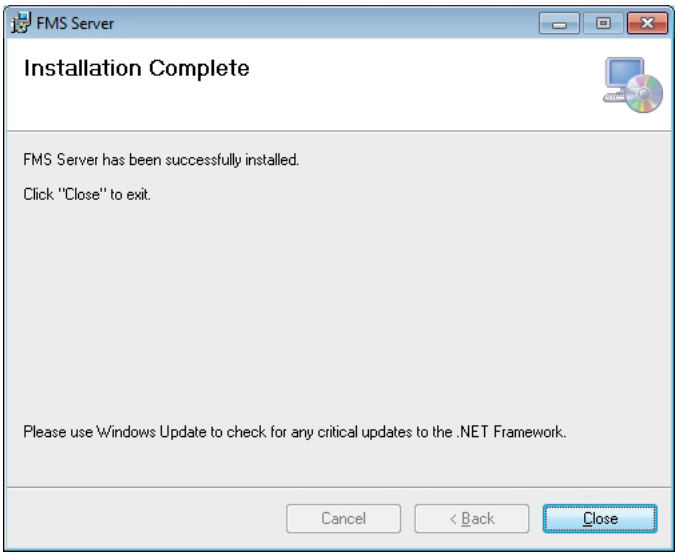
1. Select the installation folder you want the Server installed to.
   The default folder is *HIGHLY* recommended.
2. Click **NEXT**.


FMS Server
Confirm Installation
The installer is ready to install FMS Server on your computer.
Click "Next" to start the installation.
Cancel
< Back
Next >

3. Click **NEXT** to confirm the installation.



During the installation, a screen similar to this one displays, showing the installation progress:


FMS Server
Installation Complete
FMS Server has been successfully installed.
Click "Close" to exit.
Please use Windows Update to check for any critical updates to the .NET Framework.
Cancel
< Back
Close

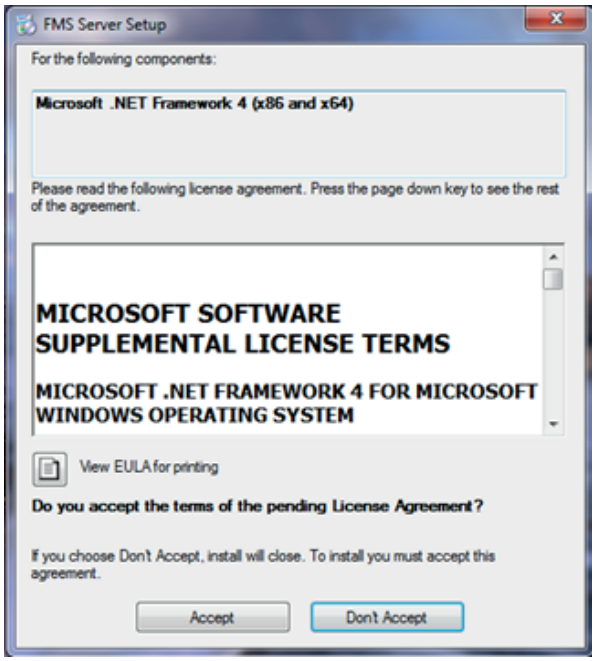
When the installation is complete, a screen similar to this one displays.

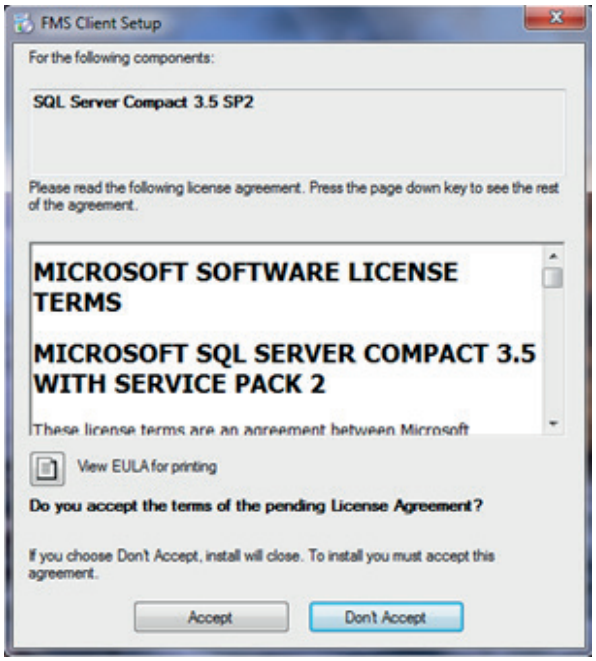
4. Click **CLOSE** to exit the installer.

Installing the LMS-RF Client

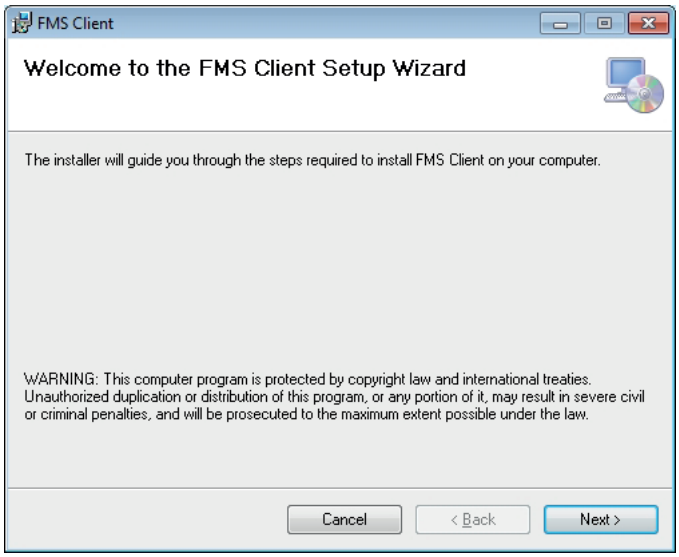
1. Select **Install Client**.
   The .NET 4.0 Framework installer will appear here if the Client is being installed on a machine without it. The Client will also install the SQL Compact Edition if it is not installed.

2. Click **ACCEPT**.

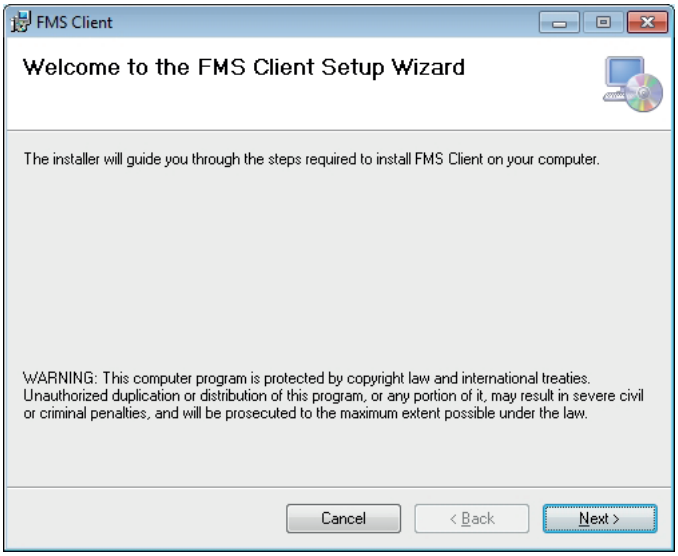

FMS Server Setup
For the following components:
Microsoft .NET Framework 4 (x86 and x64)
Please read the following license agreement. Press the page down key to see the rest of the agreement.
MICROSOFT SOFTWARE SUPPLEMENTAL LICENSE TERMS
MICROSOFT .NET FRAMEWORK 4 FOR MICROSOFT WINDOWS OPERATING SYSTEM
View EULA for printing
Do you accept the terms of the pending License Agreement?
If you choose Don't Accept, install will close. To install you must accept this agreement.
Accept
Don't Accept


FMS Client Setup
For the following components:
SQL Server Compact 3.5 SP2
Please read the following license agreement. Press the page down key to see the rest of the agreement.
MICROSOFT SOFTWARE LICENSE TERMS
MICROSOFT SQL SERVER COMPACT 3.5 WITH SERVICE PACK 2
View EULA for printing
Do you accept the terms of the pending License Agreement?
If you choose Don't Accept, install will close. To install you must accept this agreement.
Accept
Don't Accept

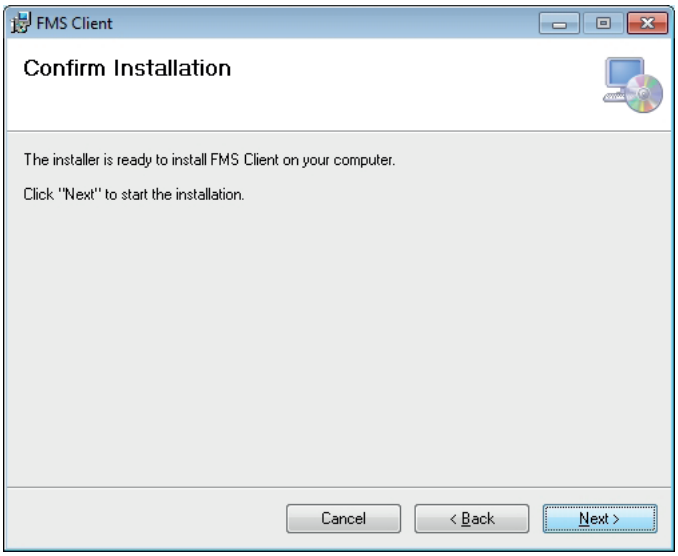
After the prerequisites are installed, the LMS-RF Client Setup Wizard screen appears:


FMS Client
Welcome to the FMS Client Setup Wizard
The installer will guide you through the steps required to install FMS Client on your computer.
WARNING: This computer program is protected by copyright law and international treaties. Unauthorized duplication or distribution of this program, or any portion of it, may result in severe civil or criminal penalties, and will be prosecuted to the maximum extent possible under the law.
Cancel
< Back
Next >

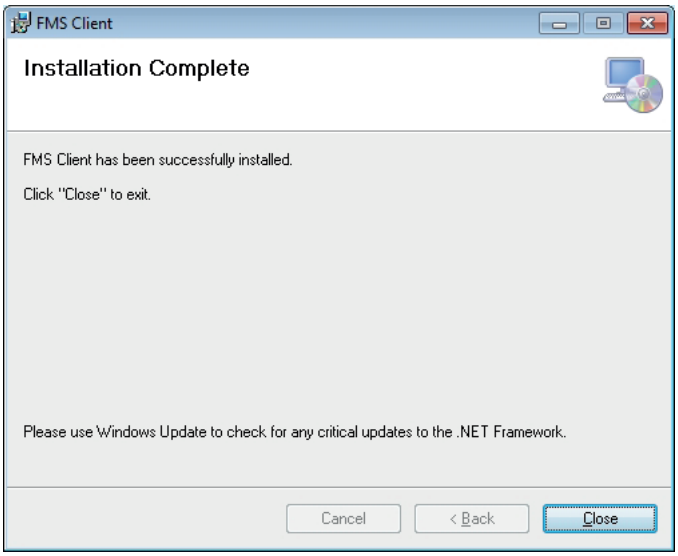
1. Click **NEXT**.


FMS Client
Welcome to the FMS Client Setup Wizard
The installer will guide you through the steps required to install FMS Client on your computer.
WARNING: This computer program is protected by copyright law and international treaties. Unauthorized duplication or distribution of this program, or any portion of it, may result in severe civil or criminal penalties, and will be prosecuted to the maximum extent possible under the law.
Cancel
< Back
Next >

2. Select the installation folder you want the Client installed to.
   The default folder is *HIGHLY* recommended.
3. Click **NEXT**.


FMS Client
Confirm Installation
The installer is ready to install FMS Client on your computer.
Click "Next" to start the installation.
Cancel
< Back
Next >

4. Click **NEXT** to confirm the installation.


FMS Client
Installation Complete
FMS Client has been successfully installed.
Click "Close" to exit.
Please use Windows Update to check for any critical updates to the .NET Framework.
Cancel
< Back
Close

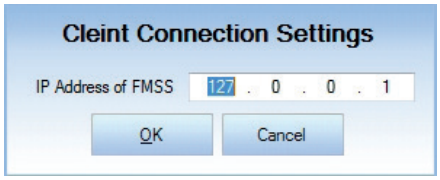
When the installation is complete, a screen similar to this one displays.

5. Click **CLOSE** to exit the installer.

Launching the LMS-RF Software

To launch the software, click on the LMS-RF Client icon on your desktop

Before you can begin, you first need to tell the Client application the IP address where the server resides.



1. Enter the IP address of the LMS-RF server.

For the Client installed on the server, the IP address should be 127.0.0.1.

For the Client not installed on the server, enter the IP address assigned to the server.

LMS-RF System Configuration

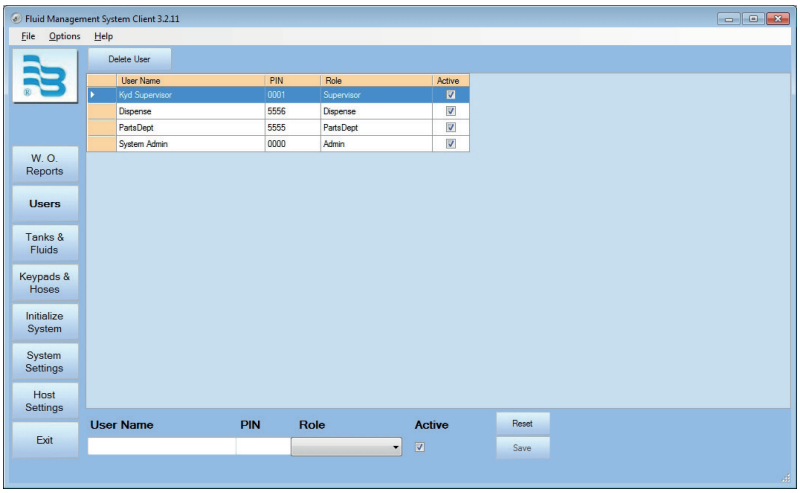
2. Enter the 4-digit system password and click the **OK** button.

The system admin password is initially set to 0000.

USING THE LMS-RF SOFTWARE

Setting Up New Users

The default names and pins may be changed at any time by highlighting the text, deleting it, and entering the appropriate text. To save changes made, click the **SAVE** button.



1. To add a new user, click the **RESET** button.

The information will clear from the text boxes.

2. Enter a user name, new pin (cannot duplicate any currently used pin number), and assign a role.

If you wish to set up a user having multiple roles, you will need to create a user and pin number for each role.

New User Roles

The choices for role selection are System Admin, Supervisor, Parts Dept, and Dispense. These choices will allow the user to do the following:

System Admin	Make changes to all levels of the software, from the PC only.
Supervisor	Make changes at the keypad only.
Parts Dept	Enter work orders at the PC.
Dispense	Enter a work order id at dispense keypad to complete dispense..

Active or Inactive Users

Only users who have an *Active* status will be allowed to access their respective duties.

To make a user active or inactive:

1. Select the user's name.
2. Check the **Active** box.
3. Click **SAVE**.

Users with multiple roles will require a unique password for each role.

Deleting a User

To delete a user:

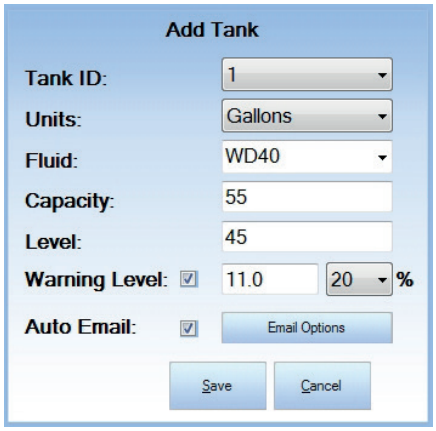
1. Select the user's name.
2. Click the **DELETE USER** button in the top left-hand corner.
3. Confirm your request to delete the user.

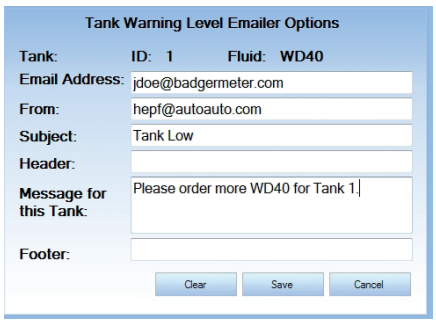
Setting Up Tanks and Fluids

Using the software, you can track and monitor tank levels based off work orders. To track this, you first need to add a tank and its corresponding fluid.

These are the fields of information required to add a tank:

Tank ID	The *Tank ID* field automatically displays the next available sequential ID number. You can also select available tank IDs from the drop-down menu.
Units	The *Units* field specifies the units of measurement that you use to track the tank level. The choices are Gallons, Liters, Pints and Quarts.
Fluid	The *Fluid* field specifies the type of fluid in the tank. You can also select existing fluids from the drop-down menu.
Capacity	The *Capacity* field specifies the total amount of fluid that may be stored in that tank. Enter a numeric value that corresponds to the capacity of the tank (the value will be in the units you previously identified).
Level	The *Level* field specifies the current level of fluid in the tank.
Warning Level	The *Warning Level* field specifies the fluid level at which you would like a warning message emailed to a particular person. A warning message will appear on any running client screen when a completed work order brings the tank level down to, or below, the warning level setpoint. To use this feature, click the check box and enter either a nominal value or percentage (the other value with self-propagate after you enter the first value).
Auto Email	Check the *Auto Email* checkbox to bring up a screen to specify email settings for the warning message. When the tank reaches the specified Warning Level, this email will be sent to the email recipient. Multiple recipients can be defined. Enter a semicolon (;) between each e-mail address. **NOTE:** This is not a required field. This option will not run if email settings are not activated. See *"Email Settings" on page 46*.



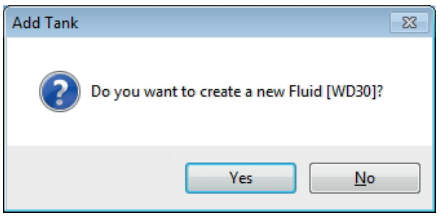


To set up a tank:

1. Click on the **ADD TANK** button.
2. In the *Units* field, select a unit of measure from the drop-down menu.
3. In the *Fluid* field, enter a fluid name in the text box or select a fluid from the drop-down menu.
4. In the *Capacity* field, enter the total number of units (gallons, liters, pints or quarts) of fluid that may be stored in the tank.
5. In the *Warning Level* field, enter the fluid level at which to trigger a warning message.
6. To specify the email setting for the warning message, check the box next to *Auto Email*, then select *Email Options*.
7. Enter the email address of the recipient.
8. Type a message.
9. Click **SAVE** to close this screen and return to the *Add Tank* screen.
10. Click **SAVE** again to save your changes and exit the *Add Tank* screen.

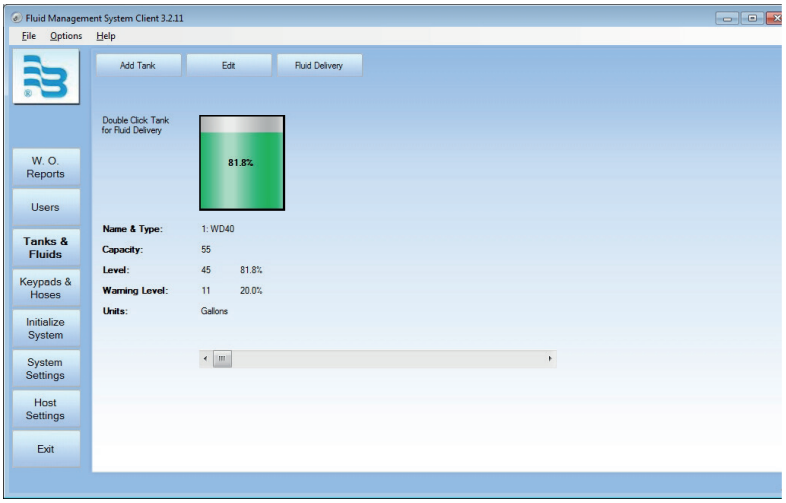
NOTE: If the fluid you entered was not in the drop-down list, you will be asked if you want to create a new fluid when you exit this screen.

Creating a New Fluid



11. If the fluid you entered during the *Add Tank* procedure was not in the drop-down list, click **YES** if you want to create a new fluid.

The new fluid will now appear in the *Fluid Type* drop-down list.



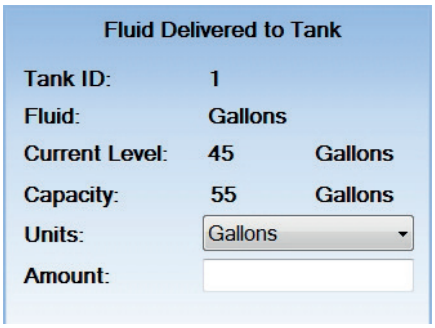
After you set up a tank and fluid(s), the software displays graphical representation of the tank level, including:

- the percentage of fluid remaining in the tank.
- the tank information that was entered in the previous step.

To change the information, click on **EDIT**.

To add a new tank, click on **ADD TANK** and repeat the process explained in *"Setting Up Tanks and Fluids" on page 40*.

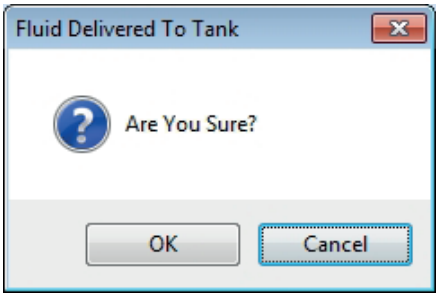
To track when fluid is added to the tank, click on **FLUID DELIVERY**.



You can edit the amount of fluid added and the units in which it was added (gallons, liters, pints, and quarts).

After entering the information, click **SAVE** to save your changes.

You will be asked to verify your changes.



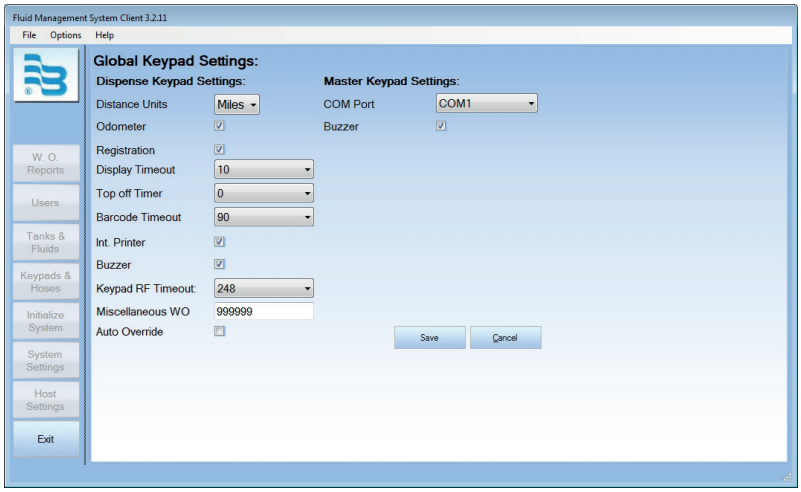
When the verification screen appears, click **OK**.

Setting Up Keypads and Hoses

Adding keypads and hoses allows you to build out your entire system and send work orders to the appropriate stations.

Global Keypad Settings

Before starting, make sure your Global Keypad Settings are configured correctly.



1. Click the **SETTINGS** button.
2. Change any settings according to the *"Dispense Keypad Settings"* and *"Master Keypad Settings"* tables below.
3. Click **SAVE** to save your changes or **CANCEL** to discard the changes and return to the *Main* screen.

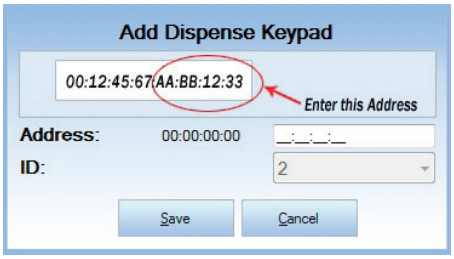
Dispense Keypad Settings

Distance Units	Specifies the units (miles or kilometers) of odometer readings for each WO.
Odometer	To request that mileage be tracked, check the Odometer checkbox.
Registration	To request that the car registration number be tracked, check the Registration checkbox. This allows the system users to enter the car registration number in the Pending WO and save it to the Completed WO.
Display Timeout	Sets how long (in minutes) a PIN will be able to sit idle before timing out and forcing the user to log back in.
Top off Timer	Sets the time that the user is allowed to keep the meter open after the allotted amount of fluid has been dispensed (timer is in seconds).
Barcode Timeout	The amount of time in increments of 10 ms to display the entered parameter on the screen after the barcode scanner input is entered. A value of 100 will equal 1000 ms or 1s of display time. This timeout is only used when the barcode scanner feature is selected on the keypad.
Int. Printer	If you have an optional internal printer connected to the keypad, select the checkbox next to the *Int. Printer* field.
Buzzer	To activate the key click buzzer, check the box next to the *Buzzer* field.
Keypad RF Timeout	Sets how long (in minutes) a PIN will be able to sit idle before timing out and forcing the user to log back in.
Miscellaneous WO	A configurable numeric input that allows the user to define what number a miscellaneous work order gets. This would be used in the event any fluid needs to be dispensed independent of a system work order. The miscellaneous work order number along with the user ID number will be in the work order report. To change, simply highlight the number, delete, and enter a new number.
Auto Override	Activates System Auto Override feature in all keypads so users can dispense WOs when the Master Keypad is not operational. No supervisor intervention is required. Available with v3.X firmware only.

Master Keypad Settings

COM Port	Select the COM port on the PC for the serial connection to the Master Keypad. To change, simply click on the drop down and select the appropriate COM port.
Buzzer	To activate the key click buzzer, check the box next to the *Buzzer* field.

Adding a Dispense Keypad

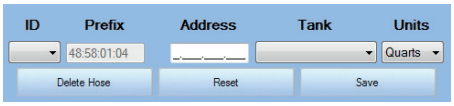


1. From the *Keypad and Hoses* screen, click **ADD KEYPAD**.
2. Enter the Dispense Keypad address found on the back of the keypad. Use only the last 8 characters as shown here:

3. The ID field automatically displays the next available sequential number.
4. Click **SAVE**.

Adding Hoses

Once you have added a keypad, you can begin adding hoses associated with it. You can also enter hoses not associated with any keypad. You can drag and drop hoses to a keypad or between keypads.

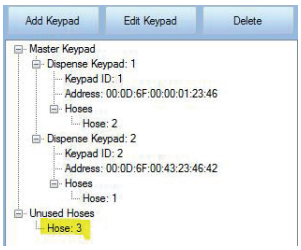


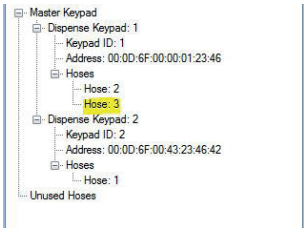
To add hoses, fill in the information at the bottom right-hand corner of the *Keypad and Hoses* screen:

1. Enter the hose *ID* found on a tag on the meter.
2. Enter the hose *Address*.
3. Enter the *Tank* the fluid will be dispensed from.
4. Enter the dispenser *Units* of measure of the meter.
5. Click **SAVE**.

After the hose is added, it will appear under the *Unused Hoses* section or under the selected keypad.

Associating an Unused Hose with a Keypad





To associate an unused hose with a keypad:

1. Drag and drop the hose from the *Unused Hoses* section to the keypad section.

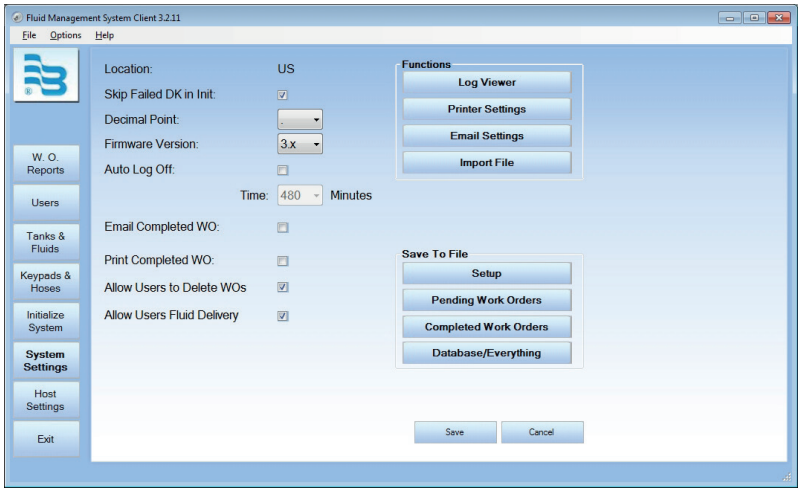
   OR

2. Move it manually by selecting the hose(s) from the list on the right and assigning them to keypads using the drop-down next to the *Move Hoses to:* field.

To delete a hose, select it on the left and click the **DELETE HOSE** button.

System Settings

To change system settings, select the **System Settings** tab on the left-hand side. A screen similar to the one below appears:



1. Change any settings according to the tables below.
2. Click **SAVE** to save your changes or **CANCEL** to discard the changes and return to the *Main* screen.

System Settings Fields

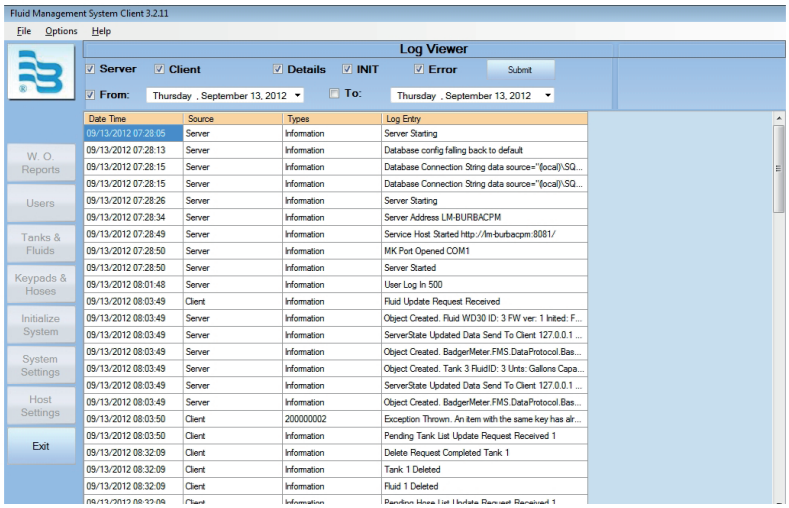
Location	Location is set as a factory default and cannot be changed by the user.
Skip Failed DK in Init	The system can be configured to skip a keypad that it cannot communicate with and continue with the initialization process. To activate this, check the box next to *Skip Failed DK in Init*.
Decimal Point	Select a period or comma as the decimal point.
Firmware Version	Select the firmware version your master and Dispense Keypad is using. Version 1x can support 99 meters, version 2x and version 3x for 2.4 GHz radios can support up to 250 meters.
Auto Log Off	If you would like the software to automatically log off the PC user after a specified period of time, check the box next to *Auto Log Off* and chose the time (in minutes) you would like the PC user to remain idle before being logged off.
Email Completed WO **Print Completed WO**	Work Orders may be emailed or printed upon completion. To set this up, check the box next to the corresponding text. There are two buttons in the *Functions* section. Use the *Printer Settings* button to select a printer that is available on your network. Use the *Page Setup* to set up paper formatting information. Enter text that you want to appear on the printout in the work order message box. Make the appropriate changes, then click **SAVE** to save your changes and exit the printer settings. The **CLEAR** button will reset all of the information on the form.
Allow Users to Delete WOs	To allow dispense users to delete work orders, check the box next to the *Allow Users to Delete WOs* field.
Allow Users Fluid Delivery	To allow dispense users to enter a fluid delivery, check the box next to the *Allow Users Fluid Delivery* field.
*** Auto Override**	Enables the Dispense Keypad to automatically enter System Override mode when communication is lost to the Master Keypad.

* Available for v3.x firmware only.

System Settings – Functions Options

Log Viewer

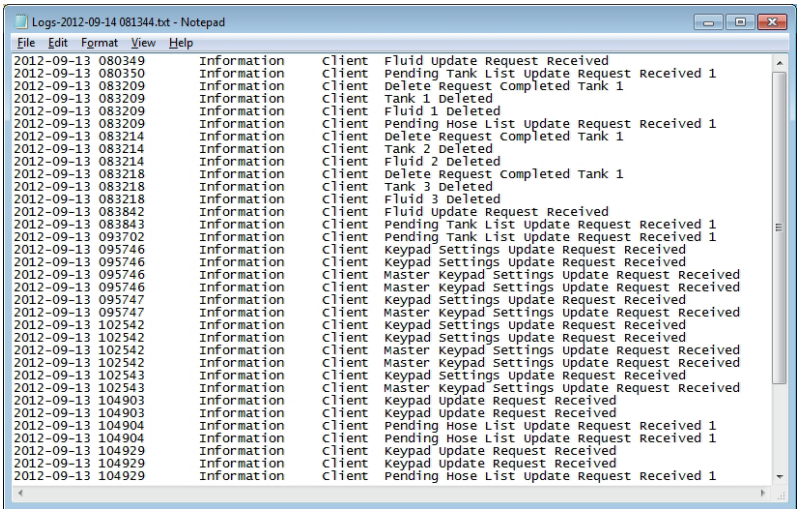
Use the Log Viewer to display system activity logs based on the parameters you choose.



1. From the *System Settings* screen, select **LOG VIEWER**.
2. Check the boxes next to the options you want to display. The options are:

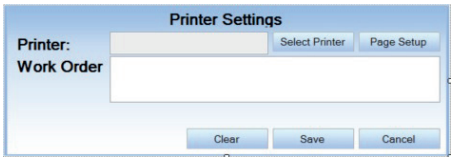
- Server
- Client
- Details
- INIT
- Error
- Date Range

3. Click **Submit**.



4. At this point, you can click the **EXPORT** button to save the file.

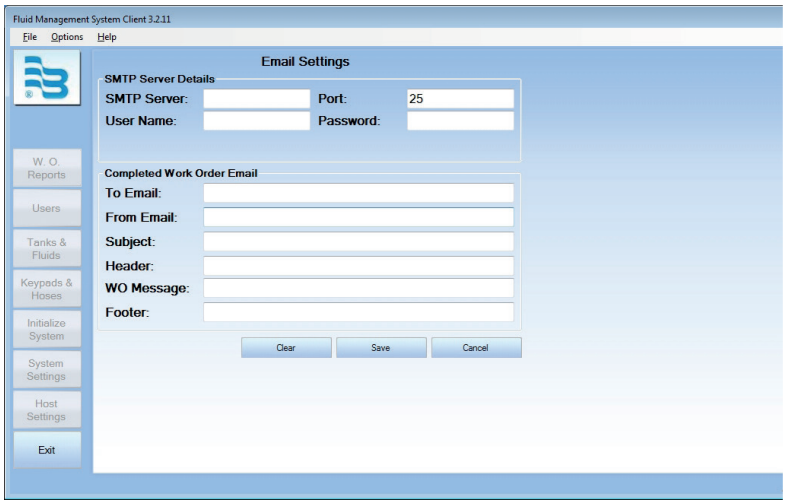
Printer Settings



1. From the *System Settings* screen, select **PRINTER SETTINGS**.
2. Click **SELECT PRINTER** and chose a printer.
3. Click **PAGE SETUP** to set up paper formatting information.
4. Enter text that you want to appear on the printout into the *Work Order Message* box.
5. Click **SAVE** to save your changes and exit the printer settings. .

Email Settings

To configure the software to send an email on the completion of a work order, enter the SMTP settings for your email server. Contact your local system administrator for information on your email server.



1. From the *System Settings* screen, select **EMAIL SETTINGS**.
2. Enter the *SMTP Server, Port, User Name* and *Password*.
3. Enter the email address of the recipient.
4. Enter your email address in the *From* line, the subject, and any header or footer text you would like.
5. Enter the work order message you would like to have in the email.
6. Click **SAVE** to save your settings.

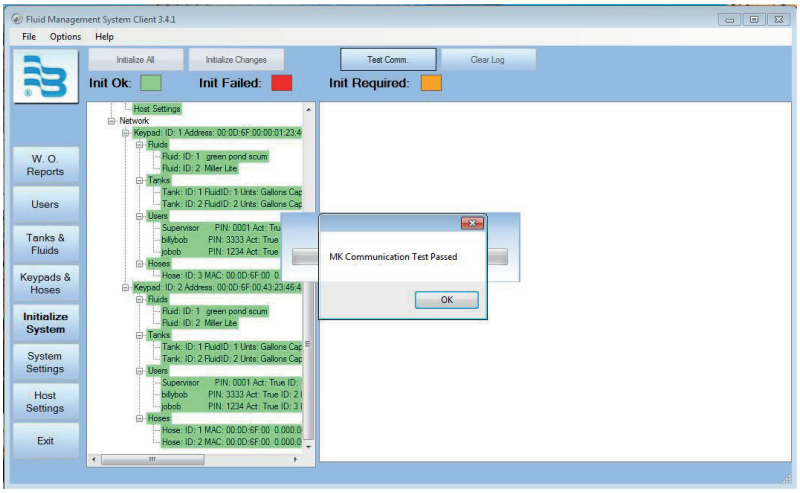
System Settings – Save to File Options

The LMS-RF Software lets you set up and save pending work orders, completed work orders, and everything in the database. To use this option, click on the corresponding buttons under *Save to File*. Browse to the destination folder or file, and click **OK**.

It is highly recommended that you save your system configuration using the *Save to File* function.

INITIALIZE SYSTEM

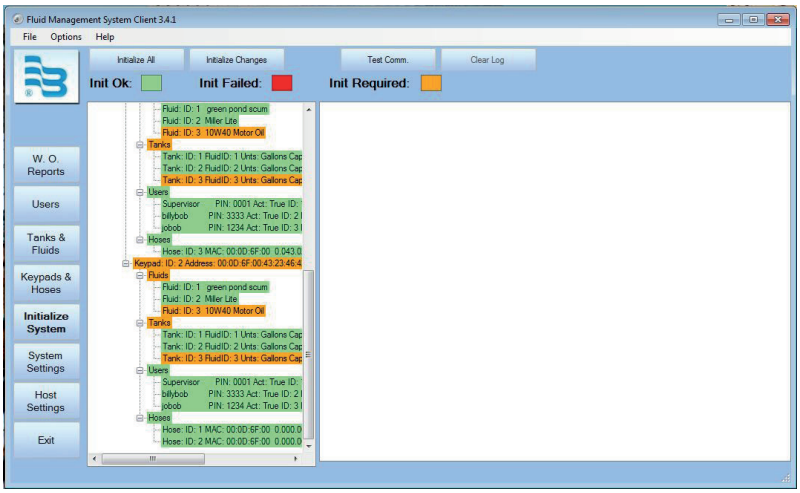
Test Comm Option



The *Test Comm* option checks that the serial cable is connected to the Master Keypad and the correct communication port has been selected.

1. To test the serial communication between the Master Keypad and PC, click the **TEST COMM** button.
2. Upon completion, a *Test Passed* screen displays.

After the system is configured you will need to initialize the system before using. The first time you select the *Initialize System* option, you will see a screen similar to the one this:



All items highlighted are color-coded to indicate their initiation status:

- Orange indicates an initialization is required.
- Green indicates the items have been initiated.
- Red indicates that the initialization process failed.

Initialize All Option

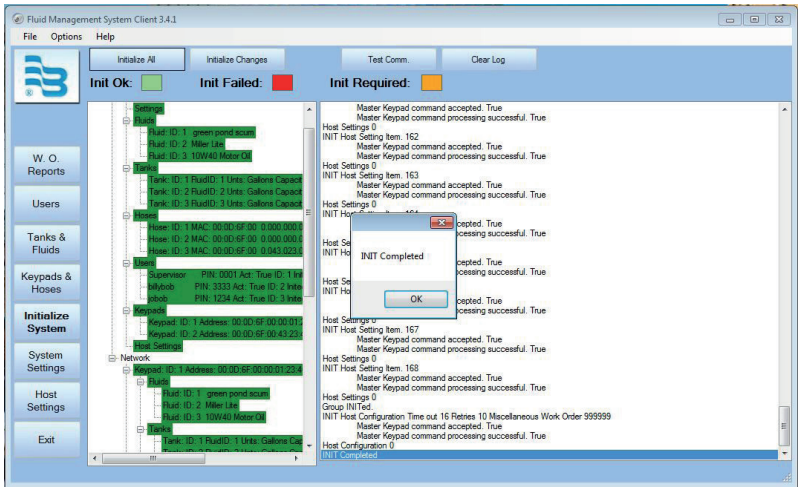
The *Initialize All* option initializes all parts of the system. This is the option to use for the first initialization.

Initialize Changes Option

The *Initialize Changes* option initializes only the changes made since the last initialization.

After clicking the appropriate button, you will be reminded that everything currently on the keypads will be erased. Click **YES** to continue or **NO** to go back. The initialization process may take several minutes. Upon completion, a *Request Completed* screen displays.

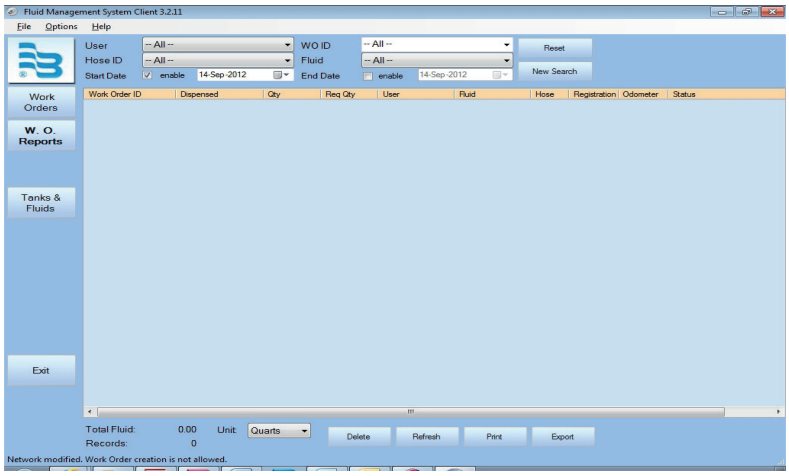
After the system is initialized, if changes are made to the system configuration it will be necessary to initialize those changes before the system can be used. You will not be allowed to make changes to the system if there are pending work orders.



To initialize only the changes, click the **INITIALIZE CHANGES** button. Any items that are highlighted in red did not initialize properly and it will be necessary to determine what is wrong. All custom settings initiated by the supervisor user will be erased.

On the right-hand side is the log of all Master Keypad communications during an initialization or communications test. To clear this log, click the **CLEAR LOG** button.

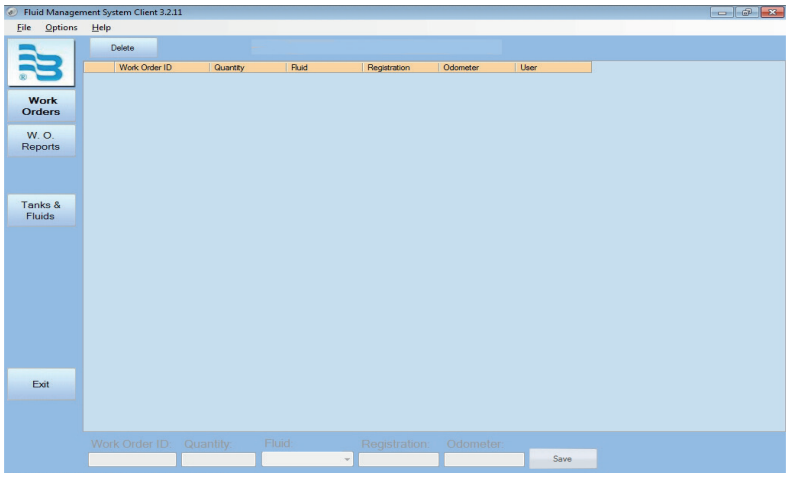
PARTS DEPARTMENT USER MENU



The parts department user can enter work orders, view work order reports, and enter a fluid delivery, if enabled.

Upon login, the screen to the left displays:

Creating a New Work Order

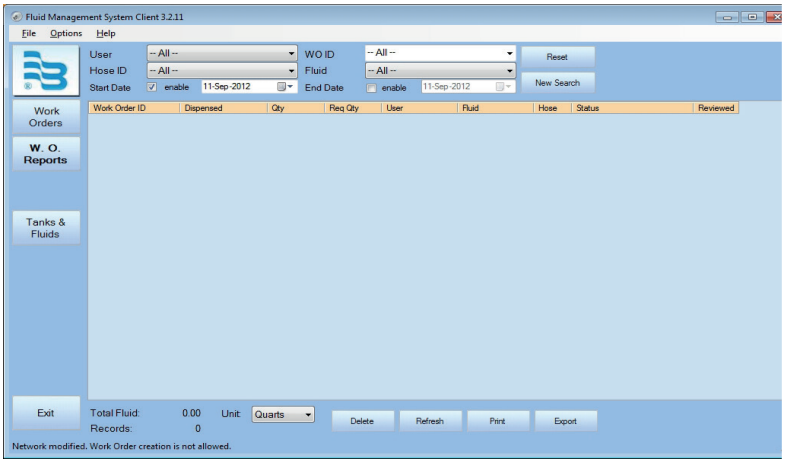


To enter a new work order:

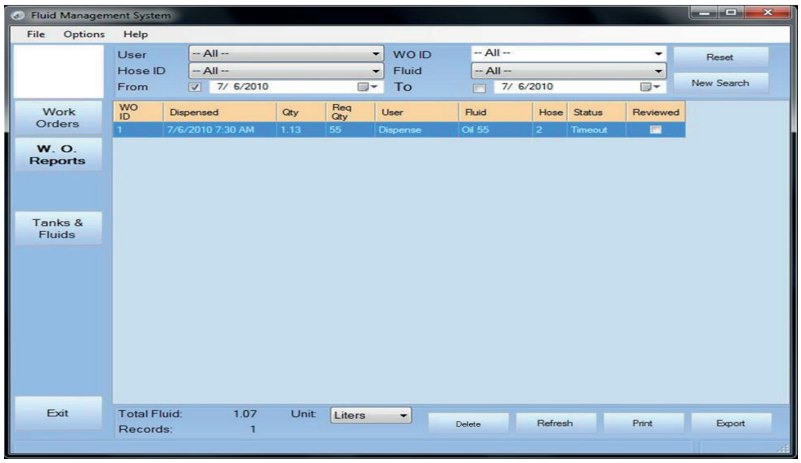
1. Click on the **WORK ORDER** option.
2. Enter a work order number in the *Work Order ID* field.
3. Enter a *Quantity* and type of *Fluid* to be dispensed in the respective fields.
4. Click **SAVE**.

Optionally, a zero quantity can be entered in the quantity and the dispense user can select the quantity at the keypad. Work Orders are stored on the PC until requested by a dispense user. Work orders can be deleted by selecting them and clicking the **DELETE** key.

Work Order Reports



To see if a work order has been completed by other personnel, click on the **W.O. REPORTS** option. If no work orders have been completed, the screen to the left displays:



The default view shows all work orders that have been completed on that day. If you have a work order completed you will see it listed in the screen to the left:

The columns across the top show:

- the work order ID number assigned,
- date and time the fluid was dispensed,
- the quantity of fluid actually dispensed,
- the quantity that was preset on the work order,
- the user who dispensed the fluid,
- the type of fluid dispensed,
- the hose the fluid was dispensed from,
- the status of the work order, and
- whether the work order has been reviewed.

Reviewing a Work Order

To mark a work order as reviewed, check the box below **Reviewed** and press **ENTER**.

Locating a Work Order

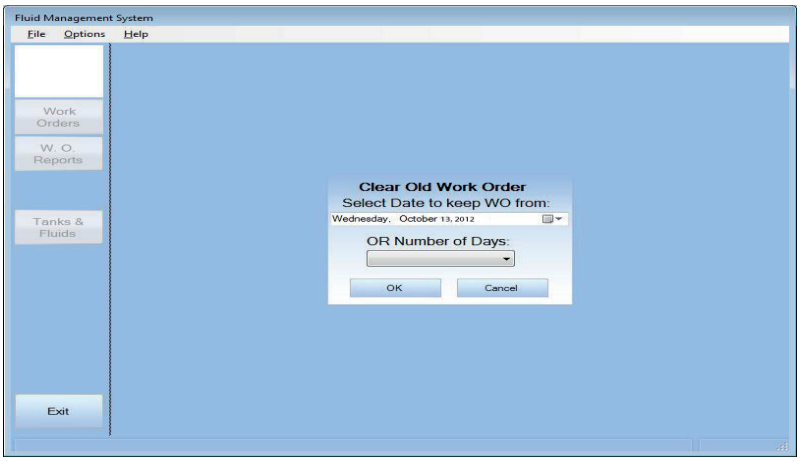
To locate a work order, you may search by user, work order ID, hose ID, fluid type, or date range.

To search, enter your criteria in the appropriate text boxes and click **NEW SEARCH**. To clear the search criteria, click **RESET**.

Changing the Unit of Measure

At the bottom of the screen, there are total fluid numbers and records counts. This will sum the total amount of fluid that has been dispensed for the records currently appearing on the search. You may change the unit that the fluid is summed in by selecting the drop-down menu next to *Unit* and choosing from Liters, Gallons, Pints, and Quarts.

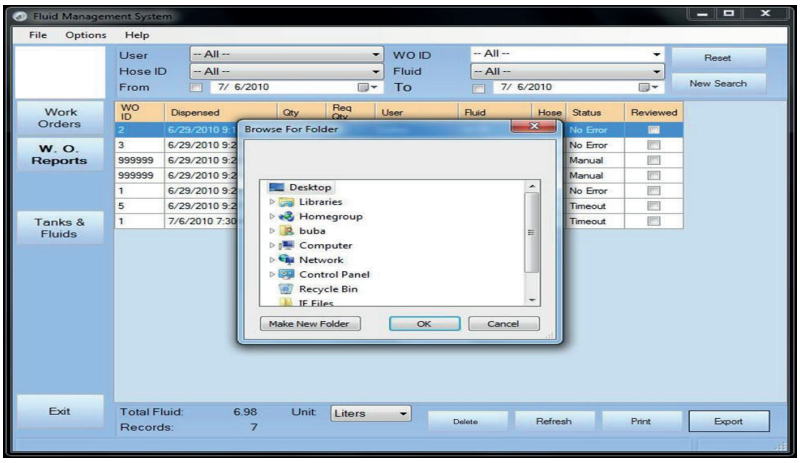
Deleting Old Work Orders



To delete old work orders:

1. Click the **DELETE** button.
2. On the pop-up screen, select either the date you would like to keep work order from (everything on and after July 6th, 2010) or the number of days (everything from 3 days ago and after) and click **OK**.
3. When asked to confirm the deletion, click **YES**. A *Request Completed* screen displays.

Exporting Work Orders to a CSV File

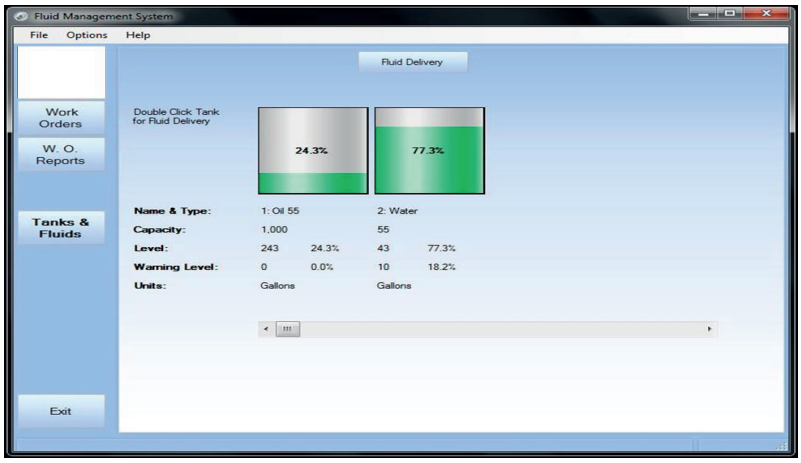


To export work orders to a semicolon-separated value (CSV) file:

1. Click the **EXPORT** button.
2. Select the folder/location that you would like to save the file to and click **OK**.
3. When the *Request Completed* screen displays, click **OK** to return to the *Work Order Reports* screen.

Tanks and Fluids

Viewing Tank Status



To view the status of tanks in your system:

1. Click the **TANKS & FLUIDS** button.
2. View the current status and information.

To add fluid:

The information displayed includes:

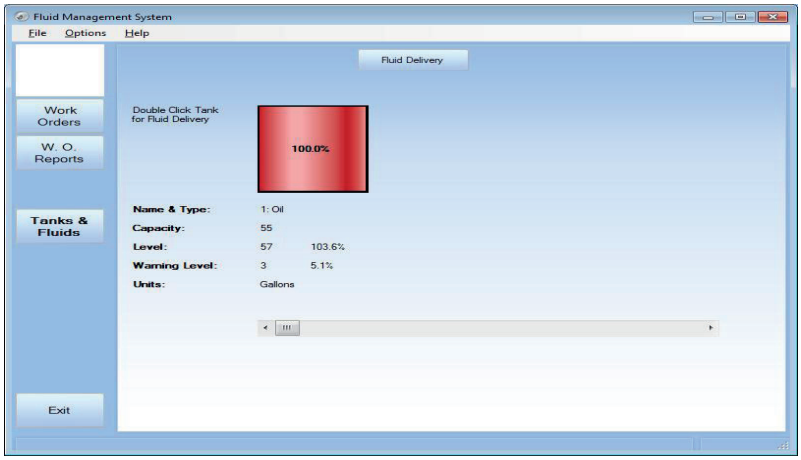
- The tank ID
- Type of fluid in that tank
- Current level of the tank
- Total capacity of the tank

Adding Fluid to a Tank

If this feature is enabled, you can add fluid upon delivery.

To add fluid to a tank:

1. Double-click on the tank or select the tank and click on **FLUID DELIVERY**.
2. Select the unit of measure the fluid will be delivered in (gallons, quarts, liters, or pints).
3. Enter the amount (in the selected units) of fluid that is being delivered.
4. Click **SAVE** to save your changes or click **CANCEL** to discard your changes.
5. Click **OK** on the verification screen to proceed, or click **CANCEL** to edit.



If you enter an amount that brings the tank over the capacity amount, the tank will appear in a red "Warning" state until the proper amount of fluid is removed via work order or the administrator goes into the software and manually adjusts the level of the tank.

Only the system administrator can correct a tank level.

To exit the software, click the **EXIT** button.

When tank level warnings are enabled and a fluid dispense causes the tank level to hit the warning level, a message will appear on all part department users screen. Click **OK** to clear the message.

To exit the software, click the **EXIT** button.

TROUBLESHOOTING

Dispense Keypad Error Messages

These error messages can be displayed by the Dispense Keypad. The associated action to reset the system is listed behind.

Message	Messages at the Dispense Keypad
Hose active hit hose reset	The selected meter currently has a dispense order in waiting to be processed, complete the active order. Press **RESET**.
WO refused	The entered work order number is not valid and has been refused by host or LMS-RF software.
Master is down	The master does not respond to a request from the Dispense Keypad
PC is down	The LMS-RF software (KPS) is not responding to the Master Keypad. Only if WO validation PC is activated.
HOST is down	The HOST (DMS) is not responding to the Master Keypad. Only if "WO Validation HOST" is activated. Press **RESET**.
Host or PC is occupied	Master keypad is occupied by another job. Press **RESET**.
Wrong hose for fluid	The meter selected is not a valid meter for the fluid assigned for this WO.
↑↓	RF communication is in progress, please wait (10 sec).

Meter Error Codes

The meter has several Error Codes that may display. These provide indication, at the meter, that there is an error in communication between the meter and keypad.

Message	Messages at the Meter
F01	The meter radio is not working.
	To clear the error, press the **RESET** button on the meter.
F02	The meter is not configured to a keypad.
	To clear the error code, press the **RESET** button on the meter.
	Verify that the meter radio address is configured properly.
F03	System busy.
	To clear the error, press the **RESET** button on the meter.
F08	Meter lost connection to network.
	Out of range—network connection lost.
	Keypad not powered.
	Meter moved out of range of keypad.
F09	Meter not connected to a network.
	First time being powered up.
	Network selected is not available.
SF0 (Scale Factor 0)	The Scale Factor setting for the meter is set to 0.000.
	To input a valid Scale Factor for the meter follow the instructions in the Change Factory Settings section of this manual.
All other Error Codes	Are for factory purposes only.
	To clear the meter, press **RESET**.

Press **RESET** once more at the meter.

WORKSHEETS

Tank ID	Units	Fluid	Capacity	Level
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				

Maximum: 16 Tanks

Tank volume format: 00000.000

Keypad ID	Address xx . xx . xx . xx			
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

Maximum: 36 Dispense Keypads

RF-Keypad address is an 8-digit number.

Meter ID	Address x . xxx . xxx . xxx	Tank	Unit	Keypad
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				

Maximum: 250 Meters/Hose

Meter/ Hose address is a 10-digit number.

User ID	Name User	PIN ID	Role
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
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41			
42			
43			
44			
45			

The user field is alphanumeric with a maximum of 16 characters.

The user PIN ID is a 4-digit number.

Number of Users Allowed:

- Supervisor – 1
- Dispense Users – 249
- Parts Department – 250
- Admin – 100

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